Software Library Management

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PREFACE

This manual has been produced by Honeywell Information Systems Italia. The terminology used in this manual is according to the International Federation for Information Processing and the International Computation Centre (IFIP/ICC) Vocabulary of Information Processing.

Suggestions and comments pertaining to form, content, purpose, or use of this manual are invited. Comments may be sent on the Document Review Sheet which appears at the rear of this manual.

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INTRODUCTION

This manual describes the studied organization adopted by H. I. S. I. for the handling and distribution of software intended particularly for the associates of Honeywell Information Systems, Inc. worldwide. The documentation refers to the description of "Type 3" programs of Standard H. I. S. I. and the way they function.

To furnish a clear picture of this adopted organization for the handling and distribution of the software produced by Honeywell Information Systems Italia, the manual has been divided into two parts: the first, "Organization of the System", is in general form; the second, "Description of the Various Parts of the Handling System", is more detailed. That is, information implied in the first part in general form is re-examined analytically in the second part. This subdivision permits the utilization of the manual in two ways: as an introduction to the organization of the handling system, or as documentation for the practical use of handling procedures.

The first part includes:

- A complete diagram of software handling procedures. From such synthetic diagrams for each software handling library come the programs that will be discussed and the subordinate supporting conversions.
- A general description of handling procedure.
- A description of the three principle elements that compose the system (work tapes, system control parameter cards, and auxiliary programs).
- A list of programs and orders necessary for handling a single software library.

The second part includes:

- A description of the format of preliminary cards for automatic processing.
- A description of the structure for handling procedure of the files created.
- The various handling programs and necessary information for their use (Operating Procedures). Each program is accompanied by a diagram with input and output data relative to that program.

At the end of the manual is an Appendix with a list of H. I. S. I. software management programs not directly associated with the system described.

I. ORGANIZATION OF THE SYSTEM

A. GENERAL DIAGRAM OF PROCESSING PROCEDURES FOR HANDLING SOFTWARE

Following is represented the complete system of actual procedures provided for the handling and distribution of the various preliminary libraries of software. This thorough examination of the character of the manual should facilitate the formation of a clearer understanding of the significance of the direction of consultation.

The working principles of the programs which comprise the handling system are:

- storage of software tape files
- duplication of card packs and their control (in case the software is on cards)
- distribution of software to the users

The advantages of this organization (represented in the diagram) which make this function possible are:

- Large storage capacity and minimum encumbrances.

  The result of processing is, in fact, a unique magnetic tape reel (Transport Tape) which contains all the software from time to time emitted to the foreign associates of H. I. S. I. From this Transport Tape is derived the essence of single operating systems intended for the users.

- High duplication speed and accuracy of the resulting punched data.

  The procedure of punch and punch control refers only to the programs that were on punch cards from the beginning of processing.

- Automatization of all software distribution.

  The diagram represents the software handling procedure either beginning from each single library, or keeping count of the general phases accomplished for all the libraries.

It is divided vertically into 7 parts (corresponding to 7 libraries) and horizontally into 3 parts (corresponding to 3 general phases, that is: A = the conversion and conversion control on tape of each single library originally resident on other media; B = loading the various libraries on a unique tape (Transport Tape) and duplication of the Transport Tape; C = extraction of each single library).

B. GENERAL DESCRIPTION OF THE HANDLING PROCEDURE

Software handling is accomplished with various procedures contingent on the program libraries to be handled. The actual libraries anticipated are:

- TOS-ETOS (on tape)
- DOS (on DSS130 disc)
- DOS II (on DSS110/160 disc)
- EDOS (on DSS110/160 disc)
- COS-BOS-CCQ (Quality Control Chain)- FP (Field Programs)- APPLICATIONS-SOURCE APPLICATIONS-SOFTWARE GE-53/55 (Software on punch cards in code H = Hollerith or T = Bull)
- ATRP-ATRZ (software APS-TAB 2 on tape)
- GE-58, GE-400, GE-600, etc., SOFTWARE (on punch cards in binary)

The handling of these libraries requires the TOS or DOS operating system with a minimum configuration of 12K memory.

Three phases of software library handling can be distinguished:

- Phase A : Initial

  The programs on disc (libraries 2, 3 and 4) are converted in this phase to tape, and a conversion control is effected. The programs on cards (libraries 5 and 7) are loaded on a tape called Special File (SF) with control of the accuracy of the loading.

  Only the programs that are already on tape (libraries 1 and 6) do not read this initial phase.

- Phase B : Intermediate

  This phase is common to all the software libraries. They are collected on a unique tape, the Transport Tape (TT), and this tape is duplicated for emission to all the associates upon their request.

- Phase C : Final

  The various libraries have different final phases.

  The function of this phase is to extract the files from the Transport Tape and to convert the software taken from the tape (TT) to the media on which it originally existed in the initial phase while effecting an accuracy control of the conversion.

  From a logical point of view this phase is the exact reverse of the initial phase.

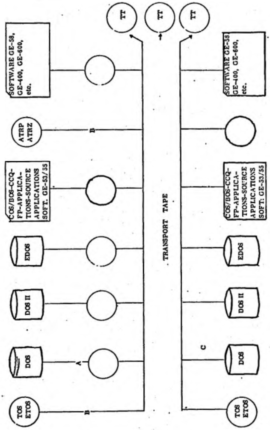
  Libraries 1 and 6, originally on tape, do not need to be converted to other media.

  The program of libraries 5 and 6 are selected, punched and punch-checked. If library 5 is composed of operating systems COS/BOS, the selection and personalization procedure can be performed automatically by means of the program SFSELECT.

  The final phase is performed by H. I. S. I. and the associates who have received the TT in order to distribute to the users the proper operating system requested.

The handling procedures for various types of software, reported above, all allow differences in the initial phase (A) and in the final phase (C) of handling. Such differences depend on the type of software to be handled and the form in which it is supplied in input (on tape, disc or punch cards). The intermediate phase (B) is, on the contrary, identical for all software handling.

INPUT


TT
TT
TT
SOFTWARE GE-58, GE-400, GE-600, etc.
SOFTWARE GE-58, GE-400, GE-600, etc.
ATRP ATRZ
A
B
COS/BOS-CCQ-FP-APPLICATIONS-SOURCE APPLICATIONS SOFT. GE-53/55
COS/BOS-CCQ-FP-APPLICATIONS-SOURCE APPLICATIONS SOFT. GE-53/55
TRANSPORT TAPE
EDOS
EDOS
DOS II
DOS II
DOS
DOS
C
TOS ETOS
TOS ETOS

PHASE A

Conversion from disc or card to tape, and control of the conversion.

PHASE B

Loading the libraries being used on TT and duplication of TT.

PHASE C

Extraction from TT of the files which generated it with eventual conversion to disc or punch cards of the same software according to its original type of media.

Diagram of the processing phases through which the software libraries pass. Phase A is performed separately for each library (except those already on tape); Phase B is common to all programs that must be loaded on the Transport Tape; the extracting phase, C, is accomplished in different ways according to the files to be extracted.

C. SYSTEM REQUIREMENTS*

1. Work Tapes

The system provides for 2 work tapes:

a. Special File (SF)

This has the function in Phase A of identifying, loading and controlling the software libraries furnished in input in punch-card form in codes H, T or binary (libraries 5 and 7).

In Phase C the program libraries originally on cards are punched out from SF to be utilized at a predetermined center.

b. Transport Tape (TT)

This has the function in Phase B of collecting all the files of software in distribution and making possible their duplication. A copy of the TT is emitted for each associate.

2. System Control Parameter Cards

The system provides for 7 parameter cards that have the function of identifying and using the programs furnished in input in the form of punch cards and contained in the SF tape.

The cards are:

a. System Description Card

(contains all information relative to the hardware configuration of a predetermined center)

b. Anagraphic Card

(contains all information relative to a certain user. This center has been described on the preceding card)

---

* A detailed description of the individual components of the system will be furnished in the second part of this manual.

c. Program Header Card

(contains all information relative to a certain program and the type of center on which it can function. This constitutes the first record of each program.)

d. Personalization Card

(contains information for the adaptation of a program or subroutine to a certain configuration of the system)

e. Program End Card

(is composed of the last record of each program)

f.	Single Call Card	Make possible calling of labelled programs and eventually their personalization by means of the proper card.
g.	Multiple Call Card	

The utilization of these system control parameter cards, together with the proper auxiliary programs, contribute to the organization and automatic handling of software programs that, at the time of input, are on cards.

Once loaded on SF together with the relative Header Cards and Program End Cards, they can, in fact, be called by means of the Single and Multiple Call Cards.

In case the software in question is COS/BOS, in addition to this manual procedure of selection, the order cards also make possible automatic selection.

They make possible the establishment of a connection between the characteristics of the system for which the software is intended (SK 1 and 2, that must be always linked together and that automatically approve the selection of programs useful to a center) and the single programs (identified by means of SK 3, 4 and 5). In using this data the system is in a position to automatically establish whether or not a program can be used by a predetermined center.

3. Auxiliary Programs

The system provides for auxiliary programs which make possible the execution of many functions.

Some auxiliary programs are intended only for the handling of single programs or groups of programs (Phase A and C), while others handle any type of software (Phase B).

The following list provides (in alphabetic order) the names of auxiliary programs, their functions, the software that they handle, the phase of processing in which they are used, and environment.

Name	Function	Software Handled	Phase	Environment
BM-MAINT	Loading and updating of the Special File tape	Software on punch cards in binary mode	Phase A	TOS
BM-PUNCH	Punching of programs from Special File and punch control	Software on punch cards in binary mode	Phase A (only control) Phase C	TOS
DITA	Disc-to-tape conversion	DOS	Phase A	TOS-DOS
. DOS2	Disc-to-tape conversion and conversion control	DOS II	Phase A Phase C (only control)	DOS II
DTC	Disc-to-tape and tape-to-disc conversion and conversion control	DOS	Phase A Phase C	TOS-DOS
. ED99	Disc-to-tape conversion and conversion control	EDOS	Phase A Phase C (only control)	EDOS
ND70	DSU110/160 tape-to-disc conversion of a file loaded on tape by means of the . DOS2 program	DOS II	Phase C	cards

Name	Function	Software Handled	Phase	Environment
NS99	Tape-to-disc conversion	EDOS	Phase C	cards
SF-MAINT	Loading and updating of Special File tape	Software on punch cards in H or T code	Phase A	TOS
SF-PUNCH	Punching of Special File programs and punch control	Software on punch cards in H or T code	Phase A (only control) Phase C	TOS
SFSELECT	Selection of programs from SF tape, according to information furnished by the cards relative to the center for which the software is intended.	COS-BOS	Phase C	TOS
TADI	Tape-to-disc conversion	DOS	Phase C	TOS-DOS
TT-COPY	Duplication of TT and duplication control	Any type file	Phase B Phase C (only control)	TOS or ETOS
TT-MAINT	Registration on TT of the software libraries	Any type file	Phase B	Tos or ETOS
TT-SELECT	Extraction of one or more files from the TT	Any type file	Phase C	Tos or ETOS

The following list gives the names of H.I.S.I. handling programs not directly connected to the described system. A detailed description of these will be furnished in the appendix of this manual.

Name	Function	Software Handled	Phase	Environment
.EPP	Extraction on tape of a source program from file G.A.S. to perform its compilation			TOS ETOS
.EXSP	Extraction on disc of a source program from file G.A.S. to perform its compilation			DOS II EDOS
HEADER-WRITE	Sector heading registration of DSU160B and C, DSU110 discs			cards
PRINTSTL	Printing of STL contained on SF tape			TOS
SEVENINE	Duplication of GE-400 software on tape, converting from 7 track to 9 track tape and without verifying the conversion	GE-400 MTPS DPS-DAPS, etc. software		TOS-ETOS
TT-COPY2	Duplication of tapes containing software of the H-200 series utilizing a GE-100 computer	Libraries on tape of H-200 system		TOS

D. DETAILED DESCRIPTION OF THE HANDLING PROCEDURES OF SINGLE SOFTWARE LIBRARIES

As already mentioned above, the software libraries have independent handling procedures. Seven diverse handling procedures are provided for. The differences in handling procedures are found in the initial phase (A) and final phase (C). The intermediate phase (B)(that consists in writing on Transport Tape the libraries processed in Phase A), is, on the contrary, the same for every type of software library.

Following is a list of functions for handling the various libraries, and the programs that perform those functions.

1. TOS-ETOS

Note: The TOS or the ETOS must always be the first file present on TT (in fact, the handling system functions in TOS or ETOS environment). When both operating systems are present, the ETOS is queued following TOS in accordance to the other software libraries.

Phase A: Absent. These operating systems are already on tape.

Phase B:

- Registration of TOS-ETOS on Transport Tape (TT-MAINT).
- Duplication of TT and duplication control (TT-COPY).

Phase C:

- Duplication of TOS or ETOS by means of .SPD program which transcribes only the first file of the TT.

  In the case of TOS, the TT-SELECT program is never used. In the case of ETOS, on the contrary, the TT-SELECT program is used only when ETOS is the second file.

- Personalization of the System Tape by means of the programs LOC TOS or .STG for TOS, and STG LOADER or .STG for ETOS, when these are registered in the TT as the first file. In the opposite case, before using the above-mentioned operations, it is necessary to use the TTSELECT to extract the ETOS file and then to personalize the System Tape with STG LOADER or .STG.
- Verification of duplication by comparing the TOS or ETOS duplicate and that registered on TT (always that ETOS is the first file on TT).

2. DOS

Phase A:

- Disc-to-tape conversion (DITA).
- Verification of the conversion by comparing disc and tape (DTC).

Phase B:

- Registration of DOS on TT (TT-MAINT).
- Duplication of TT and verification of duplication (TT-COPY).

Phase C:

- Selection of DOS from TT (TT-SELECT).
- Labelling of the System Disc (.IND).
- Tape-to-disc conversion (TADI).
- Verification of the conversion by comparing tape and disc (DTC).
- Personalization of the System Disc (LOC DOS or .SDG).

3. DOS II

Phase A:

- Disc-to-tape conversion and verification of conversion (.DOS2).

Phase B:

- Registration of DOS II on TT (TT-MAINT).
- Duplication of TT and verification of duplication (TT-COPY).

Phase C:

- Selection of DOS II from TT (TTSELECT).
- Labeling of the 110/160 System Disc (program on HEADER WRITE or .DHW cards).
- Transcription of DOS II on System Disc (ND70).
- Verification of the duplication by comparing System Disc and tape (.DOS2).
- Personalization of the System Disc (SVG LOAD or .SVG).

4. EDOS

Phase A:

- Disc-to-tape conversion and verification of conversion (.ED99).

Phase B:

- Registration of EDOS on TT (TT-MAINT).
- Duplication of the TT and verification of duplication (TT-COPY).

Phase C:

- Selection of EDOS from TT (TTSELECT).
- Labeling of 110/160 disc (program on HEADER-WRITE or .DHW cards).

- Tape-to-disc conversion (NS99).
- Verification of the conversion by comparing disc and tape (. ED99).
- Personalization of the 110/1 60 disc (SVG LOAD or . SVG).

5. COS-BOS-CCQ (Quality Control Chain)-FP (Field Programs)-APPLICATIONS-SOURCE APPLICATIONS-SOFTWARE GE-53, GE-55

Phase A:
- Loading or updating of this library's programs on Special File tape (SF-MAINT).

Phase B:
- Registration on Transport Tape of the SF file (TT-MAINT).
- Duplication of the TT and verification of duplication (TT-COPY).

Phase C:
- Selection of file from TT (TT-SELECT).
- Selection of programs from SF file (SFSELECT) and their personalization (this operation is optional and is possible only for COS/BOS).
- Punch and punch control of the programs selected or not selected (SF-PUNCH).

6. ATRP-ATRZ (Software APS-TAB on Tape for Reader-Punch)

Phase A:
- Absent. This file is already on tape.

Phase B:
- Registration of ATRP-ATRZ on Transport Tape (TT-MAINT).
- Duplication of the Transport Tape and verification of duplication (TT-COPY).

Phase C:
- Selection of the ATRP or ATRZ from the TT (TTSELECT).

Note: For the selection of ATRP-ATRZ from the TT, it should be kept in mind that these APS/TAB2 compilers total 4 and are loaded on tape in fixed order. To select one of these it will therefore be necessary to select also those that eventually precede it.

7. GE-58 - GE-400 - GE-600, etc. Software (All the Software Punched on Cards in Binary Mode)

Phase A:
- Loading of the programs punched on cards in binary onto SF tape (BM-MAINT)
- Verification of this loading (BM-PUNCH).

Phase B:
- Registration on the Transport Tape of the SF file (TT-MAINT).
- Duplication of the TT and verification of duplication (TT-COPY).

Phase C:
- Selection of the SF from the TT (TTSELECT).
- Punching of the program and verification of punching.

TOS	ETOS (as first file)	ETOS (as 2nd file)	DOS	DOS II	EDOS	COS-BOS CCQ-APP-SOURCE APP-SOFT. GE-53/55	ATRP ATRZ	SOFTWARE GE-58 GE-400 GE-600
TT-MAINT	TT-MAINT	TT-MAINT.	DITA	.DOS2	.ED99	SF-MAINT	TT-MAINT	BM-MAINT
TT-COPY	TT-COPY	TT-COPY	DTC	TT-MAINT	TT-MAINT	SF-PUNCH (only control)	TT-COPY	BM-PUNCH (only control)
.SPD	.SPD	TT-SELECT	TT-MAINT TT-COPY	TT-COPY TTSELECT	TT-COPY TT-SELECT	TT-MAINT TT-COPY	TTSELECT	TT-MAINT
TT-COPY (only control)	TT-COPY (only control)	STG LOADER or .STG	TT-SELECT	HEAD WRITE or .SHW	HEAD WRITE or .DHW	TTSELECT SFSELECT (optional)		TT-COPY
LOC TOS or .STG	STG LOADER .STG		TADI	ND70	NS99			TTSELECT
			DTC	.DOS2 (only control)	.ED99 (only control)	SF-PUNCH		BM-PUNCH
			.IND		SVG LOAD or .SVG			
			LOC DOS or .SDG	SVG LOAD or .SVG				

Table of Handling Programs and Their Successive Order

II. DESCRIPTION OF THE VARIOUS PARTS OF THE HANDLING SYSTEM

A. SYSTEM CONTROL PARAMETER CARDS

The denomination and general function of the 7 system control parameter cards provided for the handling system, has been described in the first part of this manual (C. SYSTEM COMPOSITION, 2. System Control Parameter Cards).

In Phase A the system control parameter cards identify and organize together those programs which are loaded on tape. The cards used in this phase are:

Header Cards
Eventually Personalization Cards (used only for COS/BOS programs)
Program End Cards

In Phase C the system control parameter cards select and personalize the programs loaded on TT.

The selection can always be manual through the use of Single Call Cards or Multiple Call Cards. Only in the case that the operating system used is COS/BOS, can the selection also be automatic; in this case the SF-SELECT program is used which uses the System Description Card and the Anagrafic Card (in addition to eventually Single and Multiple Call Cards) for the selection and personalization of the COS/BOS program.

Following is the format of the 7 system control parameter cards corresponding to the information to be registered and used for the automatic handling of the Special File tape.

1. System Description Card (C)

Col. 1 = card code C

Col. 2-19 = not used

Col. 20 = punch code: 1 = Hollerith
2 = Bull

Col. 21	= memory size:	1 = 4K 2 = 8K 3 = 12K 4 = 16K
Col. 22	= card reader:	1 = integrated reader
Col. 23	= printer:	1 = integrated printer 2 = PRT 105 6 = standard printer 9 = integrated/standard printer
Col. 24	= card punch:	1 = CPZ 101-102 3 = CPZ 103-104 5 = P 150
Col. 25	= reader/punch:	1 = CRP 100-101
Col. 26	= tape controller:	1 = MTC 103 2 = MTC 106 3 = MTC 114 4 = MTC 104 5 = MF (phase modulation) 9 = ELEA
Col. 27	= number of tapes connected to the controller	
Col. 28	= paper tape reader:	1 = PTR 100 2 = PTR 101 3 = PTR 100/101
Col. 29	= paper tape punch:	1 = PTP 110 2 = PTP 111 3 = PTP 120
Col. 30	= disc controller:	1 = DSC 130
Col. 31	= number of disc units	
Col. 32	= Datanet:	1 = SLC 100-1-2-3 5 = SLC 115
Col. 33	= not used	
Col. 34	= magnetic document:	1 = MDR 100-101 3 = MRS 102-103
Col. 35-38	= reader to be assigned	

Col. 39 = personalization code:
- b̸ = not requested
- 1 = personalization requested according to the codes reported in columns 41-50

Col. 40 = not used

Col. 41-50 = these columns contain the number (in hexadecimal) of the peripheral unit used for personalization. In particular:

- Col. 41-41 = connector number of the card punch
- Col. 43-44 = connector number of the Audit paper tape reader (PTR 100)
- Col. 45-46 = connector number of the Standard paper tape reader
- Col. 47-48 = connector number of the paper tape punch
- Col. 49-50 = connector number of the Datanet

Col. 51-56 = to be assigned

Col. 57-79 = predetermined center

Col. 80 = hardware:
- 1 = GE 105A
- 2 = GE 105B
- 6 = GE 115-120-130

2. Anagraphic Card (A)

Col. 1 = card code A

Col. 2- 7 = not used

Col. 8-30 = name of person responsible at the center

Col. 31-56 = address of center (street and number)

Col. 57-61 = zip code (CAP)

Col. 62-75 = city and province

Col. 76-79 = to be assigned

Col. 80 = hardware (equal to those in column 80 of card C)

3. Program Header Card (FFFF)

Col. 1- 4 = code FFFF

Col. 5- 8 = order number (progressive number for the identification of the programs on tape)

Col. 9-12 = program code (for programs divided in more segments with different codes, report the code of the first segment)

Col. 13-32 = program description

Col. 33-37 = program date (expressed in the form AAGGG)

Col. 38-41 = number of cards comprising the program

Col. 42-69 = these columns contain the information for defining the configuration of the system on which the program can be used. The code defined for the GE-100 line are the following:

- Col. 42 = punch code:
  - 1 = Hollerith
  - 2 = Bull T 121
  - 3 = Hollerith and Bull T 121
- Col. 43 = memory size:
  - 1 = 4K
  - 2 = 8K
  - 3 = 12K
  - 4 = 16K
- Col. 44 = card reader:
  - 1 = integrated reader
- Col. 45 = printer:
  - 1 = printer with integrated controller
  - 2 = PRT 105
  - 3 = printer with standard controller
  - 9 = any printer
- Col. 46 = card punch:
  - 1 = P 150
  - 2 = CPZ 101
  - 3 = CPZ 103
  - 4 = CPZ 101 or CPZ 103
  - 9 = any
- Col. 47 = card reader/ punch:
  - 1 = CRP 100-101

- Col. 48 = tape controller:
  - 1 = 7 tracks
  - 2 = ELEA
  - 3 = 7/9 track
  - 4 = MF (phase modulation)
  - 9 = any
- Col. 49 = number of tape units connected to the controller
- Col. 50 = paper tape reader:
  - 1 = PTR 100 - Standard
  - 2 = PTR 101 - Audit
  - 3 = any
- Col. 51 = paper tape punch:
  - 1 = PTP 110-120-111
- Col. 52 = document reader:
  - 1 = MDR 100-101
  - 2 = MRS 101-103
  - 3 = any
- Col. 53 = Datanet:
  - 1 = SLC 115
  - 9 = any
- Col. 70 = print type:
  - C = condensed cards
  - S = APS cards
- Col. 71 = personalization method:
  - S = with search for column number
  - * = with search for character *
- Col. 72 = unit code for personalization:
  - b̸ = personalization not requested
  - 1 = reader/punch (No. 40 is used. In the case that the Datanet is anticipated, 30 is used.)
  - 2 = card punch
  - 3 = Audit paper tape reader PTR 101

Col. 72 (cont.)
4 = Standard paper tape reader PTR 100
5 = paper tape punch
6 = Datanet

Col. 80 = hardware:
b̸ = GE-105 and GE-115
2 = only GE-105
6 = only GE-115
* = only on request (cannot be selected) with SFSELECT

Note: Cases can arise in which some programs require one reader instead of another, one or the other reader indiscriminately, or both. Therefore, it adopts the following system:

Col.	44	47
	CRZ	CRP
Requests only CRZ	1	b̸
Requests only CRP	b̸	1
Requests either	b̸	b̸
Requests both	1	1

4. Personalization Card (P)

Col. 1 = card code P

Col. 2 = segment (least significant digit of the program code)

Col. 3- 6 = card number

Col. 7- 8 = column number containing the left-hand digit of the peripheral unit number

Col. 9-15 = as from 2 to 8

Col. 16-22 = " " " "

Col. 23-29 = " " " "

.... = " " " "

.... = " " " "

Col. 72-78 = " " " "
Col. 79 (or after the last column utilized) = * (asterisk)
Col. 80 = not used

5. Program End Card (FFFF)

Col. 1- 4 = code FFFF
Col. 5- 8 = 9999

For the programs punched in binary mode this card must contain the configuration !!!! in Col. 1-4 instead of FFFF.

6. Single Call Card (FFFF)

Col. 1- 4 = card code FFFF
Col. 5- 8 = order number of the program on tape SF

7. Multiple Call Card

Col. 1 = card code L

Col. 2- 5 = order number of the first program

Col. 6- 9 = order number of the second program

Col. 74-77 = order number of the 19th program

Col. 78 (or after the last program called) = * (asterisk)

Obviously the number of programs on tape must be punched in ascending order.

B. FILE STRUCTURE

In the first part of this manual Special File and Transport Tape have been discussed in general form (C. SYSTEM COMPOSITION, 3. Auxiliary Programs). At this point a detailed description will be furnished.

1. Special File

All input software programs on punchcards are loaded on the Special File tape in Phase A with the relative parameter cards which make possible the organization of that tape.

The Special File is on monovolume tape and contains exclusively the software punched in H or T code (library 5) or in binary code (library 7).

In 2 cases the Special File has different characteristics depending on the code in which the cards have been punched and registered:

a. The SF registered in H or T code has fixed-length blocks of 805 characters, and only the last block can be shorter. The records are card image and have a fixed length of 80 characters. Each block contains 10 records. The first 5 characters of the block contain the block number.

   When the SF contains programs punched in H or T code, it must also contain records with the following information:

   - A record at the beginning of each program created from the Header Card (FFFF) and containing the information present in that card.
   - One or more optional records (up to a maximum of 3) created from the Personalization Card. These follow immediately the header record and make possible the personalization of single programs for a predetermined center.
   - A record at the end of each program created from the Program End Card that has the configuration FFFF9999.

   In Phase C of processing it is possible to create, beginning from the SF tape, a new SF with identical structure, but containing only those programs of the original SF that have been selected and personalized and must be punched.

   The following programs are used for the handling of the SF containing software programs in H or T code:

   SF-MAINT
   SF-PUNCH
   SF-SELECT (only for COS/BOS)

b. The SF registered in binary code has fixed-length blocks of 1605 characters. The records have a fixed length of 160 characters. The first 5 characters of the block contain the block number.

When the SF contains programs punched in binary code, it must also contain records with the following information:

- A record at the beginning of each program created from the Header Card (FFFF) that contains the information present in that card. It is in this case:

  Col. 1- 4 = card code FFFF

  Col. 5- 8 = order number (progressive number for the identification of programs on tape)

  Col. 13-32 = program code

  Col. 33-37 = program date (in form AAGGG)

  Col. 38-41 = number of cards comprising the program

  Col. 42-80 = description

- A record at the end of each program created from the Program End Card. The program end card is not identified with the configuration FFFF9999, but with the binary configuration!!!!

For distribution of software registered in binary code the selection and personalization procedures are not utilized. Therefore, these programs do not need the Personalization Card.

The following programs are used for handling the SF containing software programs in binary code:

BM-MAINT
BM-PUNCH

The information furnished by the system control parameter cards makes possible the automatic handling of both the libraries by means of the proper handling programs.
The Header Card ascertains that on the SF each program is preceded by a header record that contains the information present in the corresponding card. According to the order number punched in columns 5-8 of the header card, the programs are arranged in ascending order and thus make possible their calling and handling. The Single Call Card (FFFF) and Multiple Call Card (L) are used for handling.

The Special File ends with a record created from an FFFFFFFF card.

2. Transport Tape

All the software libraries to be distributed are loaded on the Transport Tape (TT) in Phase B.

The TT organization is as follows:

- TOS or ETOS, as the first file, containing also software handling programs discussed in this manual.
- Other files follow (among which can be ETOS as the second file, if the first file is a TOS). Each file is preceded by a block that contains the initial relative to the file and that is used by the TT-SELECT program for extracting the desired files from the TT.
- The label * ETT closes the TT.

It is not possible to extract the programs separately from the TT tape.

TOS or ETOS	ETOS (only in the case that the first file is a TOS)	DOS	COS/BOS	DOS II	ATRP	EDOS		* ETT

Example of Transport Tape

Note: The Transport Tape is a mono-volume and multi-file media. In the case where a file occupies a large part of the tape and it is therefore not possible to register more files on the same reel, such a file will be distributed singularly. The structure, in this case, will be mono-volume, mono-file.

C. HANDLING PROGRAMS AND OPERATING NORMS

Listed in this section of the manual are software handling programs, and indicated for each:

- function
- minimum configuration of the installation in which the program can be executed
- various information (processing times, memory size, languages used, subroutines assembled, etc.)
- input data to be processed
- output data as a result of processing
- operating norms necessary for program functioning, parameter card preparation, etc.
- eventual controls performed by the program
- the halts and messages provided for by the program

Note: The addresses of the halts indicated in the programs are those provided for in the scope of the operating system in which they are normally distributed.

The addresses of the halts indicated in the programs that handle the Transport Tape refer to TOS.

1. BM-MAINT-Updating Program and Loading of the Special File by Means of Programs Punched in Binary Code

a. Function

The program is used for loading and updating,on Special File tape, cards containing the programs punched in binary code (GE-58, GE-400, GE-600, etc. software).

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

c. Processing Time and Memory Size

The processing times depend on many factors, most important of which are:

- speed of the peripheral units used
- number of cards to be loaded

The program occupies memory positions contained between 08FC (address of installation 2300) and 0A27.

d. Input Data

The input data consists of information punched on cards which makes up the programs for loading on tape. Each program must be preceded by the relative Header Card and followed by the Program End Card. The programs must be arranged in ascending order, according to the "order code", punched in columns 5-8 of the Header Card. The card file must end with an FFFFFFFF card.

The input data can also be the file already contained in the Special File (Unit 2) to be updated, that in the case of the first loading must be declared absent.

e. Output Data

The output data consists of: the Special File created or updated on tape unit 1 and organized as already described; and a printout containing the headings of each single program.

f. Operating Norms

A check-point is registered on the output file at 3000-card intervals which makes possible recovery by means of the order . RST. The check-point is signalled on the printer and followed by a HLT to make possible separation of the cards.

The program always functions in updating. It has the following capabilities:

- Loading

  Besides the control effected on the parameter cards (header card, end card) the records registered are card image (160 characters) on which there is no further control. It is, therefore, possible to use this program for loading, on tape, a file of the binary cards having any format.

- Duplication

It is possible to obtain duplication of the Special File if, like the input file, only the program end card (FFFFFFFF) is read. This duplication gives the advantage of having a copy of the file without the check-points that increase the time of the successive phases' processing. Also it retains a list of the programs contained on tape.

- Updating

For updating of the Special File is understood:

. Substitution of the programs on tape by those on cards
. Insertion on tape of the programs on cards
. Queueing on tape of the card programs of the tape

It is important to note that, while for substitution the program on tape must have the same "order code" as those being substituted, for insertion or queueing, the order code must differ from those already on tape.

At the end of the job the following message is printed:

END OF LOADING OR UPDATING OR TRANSCRIPTION

and control is then released to the Operating System.

For verification of loading accuracy it is necessary to use the program BM-PUNCH which has this function.

The input card sequence must be as follows:

. . PRL order card BM-MAINT, LBC card and END

.. header cards of the first program to be loaded, inserted, substituted, or queued

. cards containing the program punched in binary mode
------ Program End Card (!!!! in binary mode)

. header card of the last program to be loaded

. cards containing the program

. program end card (!!!! in binary mode)

. closing card (FFFFFFFF punched in columns 1-8)

g. Controls

The program verifies the following on the header card:

- that the code FFFF is present
- that the order number (Col. 5-8) is numerical
- that the order number is ascending

By the verification of the absence of one of these conditions, the program stops at a HLT (see Halts and Messages) to allow corrections and re-positioning of the card.

The loaded cards are counted for comparison of the total with the number contained in the header card. In the case that the two are unequal, the following message is printed:

LOADED CARDS TOTAL NNNN

where NNNN is the number of cards actually loaded.

h. Halts and Messages

The program provides for the following HLT's:

2330 = header card wrong. Correct the card, reposition it on the printer, and press START.

00FA = check-point

The program provides for the following messages:

END OF LOADING OR UPDATING OR TRANSCRIPTION	Printed at the end of the job.
LOADED CARDS TOTAL NNNN	Printed when the total number of cards loaded is not equal to those provided by the header card. NNNN indicates the number of cards actually loaded.

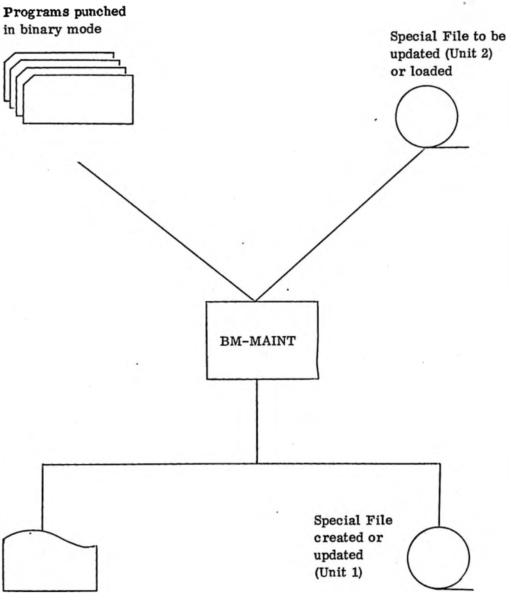

Programs punched in binary mode
Special File to be updated (Unit 2) or loaded
BM-MAINT
Special File created or updated (Unit 1)

Diagram of BM-MAINT Program Functioning

2. BM-PUNCH - Punch Program and Special File Control Recorded in Binary

a. Function

The program is used to punch and control programs of GE-58, GE-400, GE-600, etc. software loaded on Special File tape from the BM-MAINT program.

b. System's Minimum Configuration

- core store 12K
- card reader
- card punch
- 1 tape unit

c. Other Information

The source program is in APS II. The subroutine Y301B is used for punching.

d. Input Data

Input data is composed:

- in the punching phase from:
  - . Special File programs mounted on Unit 1
  - . multiple call cards
  - . closing card: FFFFFFFF in Col. 1-8
- in control phase from:
  - . Special File programs mounted on Unit 1
  - . punched programs
  - . closing card: FFFFFFFF in Col. 1-8

e. Output Data

Output data is composed:

- in punching phase from:
  - . programs punched on cards in binary mode
  - . printout with a list of numbers and programs punched
- in control phase from:
  - . printout with the resulting evidence of the control

f. Operating Norms

The Special File tape is mounted on tape unit 1.

The card sequence for calling and loading and starting the program must be the following:

- order cards . PRL BM-PUNCH, LBC and END
- multiple call cards (L code)
- closing card (Col. 1-8 = FFFFFFFF)

When punching is finished, the program stops at a HLT to wait for positioning of the cards on the reader for control. It is also possible to accomplish control in a different way; in that case it is necessary to load and start the program with SWITCH 1 ON (on the console).

If during the control errors are encountered, it is necessary to re-punch the erroneous programs using the call cards obtained and re-execute the control.

g. Controls

The program verifies the code of the multiple call card (L code). It also verifies that in the configuration of the center on which it is processed the punch is present, and provides self-compilation of the punch subroutine.

If during the control an error recurs, the program punches a call card with the relative order code and continues on to the successive program.

h. Halts

1DD6 = The control is wrong. Press START and continue on to verify the successive program.

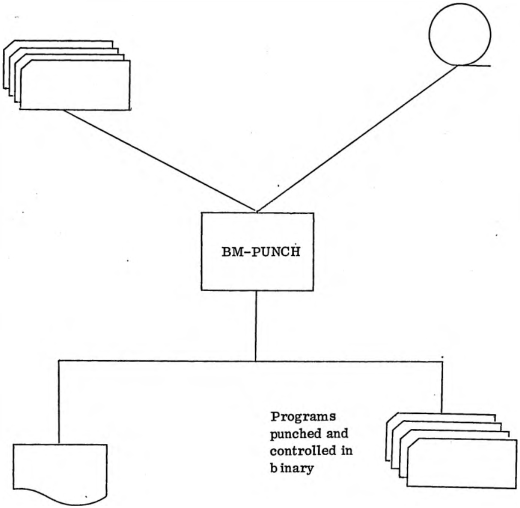
1B68 = The code of the call card is wrong. Place the corrected card in the reader and press START.

1CF2 = The header card does not have the FFFF code in Col. 1-4 in the control phase. Place the corrected card in the reader and press START.

1BEC = This HLT is verified following an error signal. The program whose order code is signalled on the printer is not present on the tape in the punching phase. Press START, a successive call card is read, and processing continues.

1B26 = Blocking HLT; card punch missing. Impossible to continue.

1CBA = Waiting HLT after punching. Place the cards to be verified in the reader and press START.



Punching: multiple card cards and closing cards

Control: programs punched in binary and closing card

Special File to be used for punching and control (Unit 1)

Diagram of BM-PUNCH Program Functioning

3. DITA - DOS Disc-to-Tape Conversion Program

a. Function

The program makes possible the transcription of the information present in an SD (or MD or LD) from disc to tape, queueing an ST (or MT), or registering on tape according to the GE-115 standard.

This makes possible in the case of a mixed installation of tapes and discs, retention in memory on tape of the contents of the SD-LD-MD and distribution of the SD using a tape media instead of a disc.

b. System's Minimum Configuration

- core store 8K
- card reader
- printer
- 1 tape unit
- 1 DSS130 disc unit

c. Input Data

The input data consists of the SD (or MD or LD) and the cards for beginning the program.

d. Output Data

The output data consists of the tape on which the SD (or LD or MD) has been registered.

e. Operating Norms

The program resides on SD or ST and queues the contents of the SD (or MD or LD) mounted on the disc unit with logical number zero to an ST (MT) mounted on a tape unit with logical number 1 or 8, or registers it on a tape mounted on Unit 1.

The disc to be transcribed does not have to be the basic disc of the system.

The ST (or MT) to which the contents of the disc are queued (if it will be used by a different system) must be already properly personalized or must be adapted by the LOC program.

The ST (or MT) must contain at least the programs essential for performing successively the transcription from tape to disc without utilizing the DOS orders.

For example, it must contain:

```
.IND
.DNA
.PRL
.FLW
.SPD
TADI
DITA
```

The card sequence for calling and starting the program must be the following:

```
.PRLDITA
END
```

The .PRL call order also contains transcription information:

Col. 17 * = asterisk
Col. 18 b̸ = the transcription is queued after the ST (MT) mounted on tape unit 8
* = the transcription is on a work tape; the tape must be already labeled (Unit 1).
≠b̸ and * = the transcription is queued after the ST (MT) mounted on tape unit 1.

Col. 19 = a character different than b̸

Col. 20 = recording density. This column may contain one of the following characters signifying:
K = 1600
L = 800
M = 556
N = 200

Once the program is called it searches the final block of the ST (or MT), performs any cancellations, registers a T. M. and then begins to register the information contained on disc (in the case that SD is queued after ST) or performs any tape cancellations.

The blocks are numbered and have the following configuration:

b̸b̸b̸b̸b̸ LLLL SSSSS O i

which individually have the following significance:

b̸b̸b̸b̸b̸ = block number

LLLL = length (unpacked) of the data contained in the block

SSSSS = sector number of the disc from which data has been taken

O = recording mode: 6 = 6 bit
8 = 8 bit

i = specifies if the data contained in the block is packed or unpacked:
0 = packed data
1 = unpacked data

f. Halts

The program provides for the following HLT:

1A7C	the disc is wrong

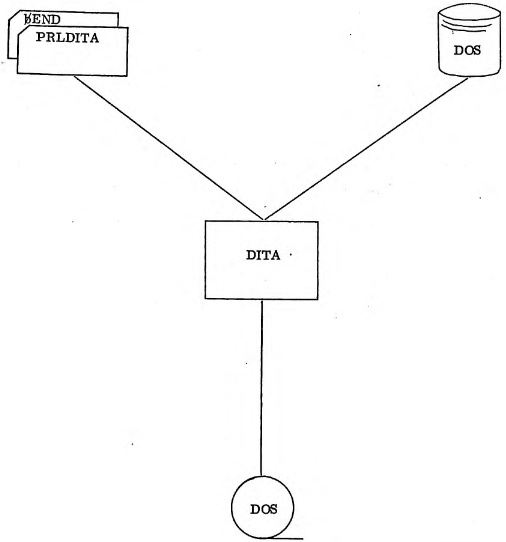


Diagram of DITA Program Functioning

4. .DOS2 - DOS II Disc-to-Tape Conversion Program

a. Function

The DOS II program makes possible an SD . transcription from disc to tape.

b. System's Minimum Configuration

- core store 8K
- card reader
- printer
- 1 tape unit
- 1 disc unit (110-160)

c. Input Data

The input data consists of the SD (DOS II) and the program start card.

d. Output Data

The output data consists of the tape on which the SD has been registered.

e. Operating Norms

The transcription can come from either 9-track or 7-track tape, because in both cases the data is unpacked. This makes possible the duplication from 9 track to 7 track and vice versa.

Before loading and starting the order card it is necessary to label the tape according to its number of tracks and its density.

After the order card is loaded and started, the program is loaded in memory and verifies the card data. If there are deviations, the program stops on an error HLT, or otherwise it continues on to the transcription on tape of the disc specified in the card. At the end of transcription, the program rewinds the tape and halts at 199A.

By pressing START the program verifies the transcription by comparing the contents of the tape and the disc. If a difference is found, it halts at 1A6C, signalling a message on the printer; otherwise it continues to the end of the control where control is released to the O. S.

The transcription is limited to 40 cylinders.

The order card is punched as follows:

.DOS2 ,D ,N ,I [,C]

which individually signify:

.DOS2 = program name
D = disc unit name
N = tape unit name
I = packing (K, L, M, N)
C = only control (optional)

f. Halts

The program provides for the following HLT's:

. Operating HLT

199A = waiting HLT after transcription. Press START to verify transcription if desired.

Error HLT

In addition to the Halts of the operating system, other Halts are provided for with the following significance:

1870 = disc unit not declared
187E = tape unit not declared
188C = density not declared
1A6C = transcription error (blocking Halt)

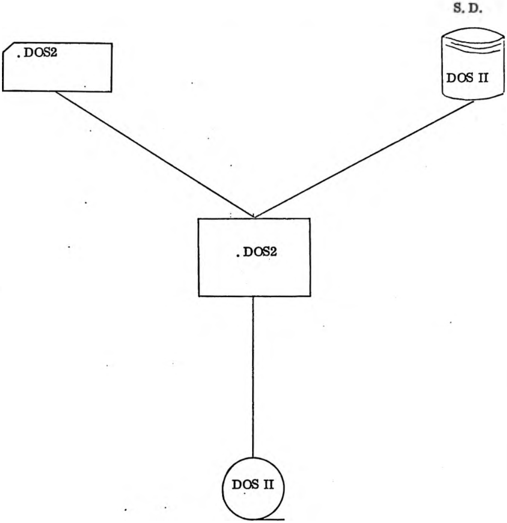


Diagram of DOS II Program Functioning

5. DTC - DOS Tape-to-Disc and Disc-to-Tape Conversion Control Program

a. Function

The program verifies the accuracy of the tape-to-disc or disc-to-tape conversion performed by the DITA and TADI programs.

b. System's Minimum Configuration

- core store 12K
- printer
- 1 tape unit
- 1 disc unit

c. Input Data

The input data consists of the tape and disc being compared and the cards necessary for starting the program.

d. Output Data

The output data consists of the eventual error signals.

e. Operating Norms

The SD residing on disc must be mounted on unit zero. The tape must be mounted in conformity to the parameters described in the .PRL card.

The cards requested for starting are:

```
.PRLDTC
ƀ END
```

All the information is introduced in the USER AREA with the card .PRL whose format is the following:

Col. 1- 7 = .PRLDTC
Col. 17 = *

Col. 18 = ƀ : the SD to be controlled is found following an ST mounted on tape unit 1.
= * : the SD to be controlled is found on a work tape mounted on tape unit 1.
≠ ƀ : the SD to be controlled is found following an ST mounted on unit 8.

Col. 20	= recording density. This column may contain one of the following characters signifying: K = 1600 bpi L = 800 M = 556 N = 200

f. Halts and Messages

In case of inequality between tape and disc, the message "INVALID TRANSCRIPTION" is printed and the program halts at 02A6. By pressing START control returns to the O. S.

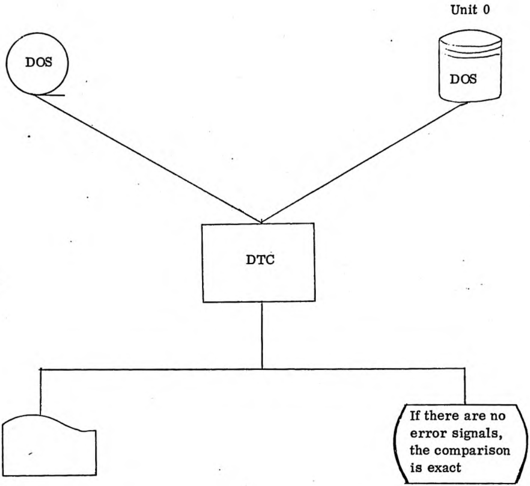


Diagram of DTC Program Functioning

6. ED99 - EDOS Disc-to-Tape Conversion Program

a. Function

The program is used for converting to tape an EDOS registered on disc.

b. System's Minimum Configuration

- core store 12K
- card reader
- 1 tape unit
- 1 disc unit

c. Input Data

The input data consists of the disc for convertion and the parameter cards which the program provides for.

d. Output Data

The output data is the tape containing the EDOS that results from the conversion.

e. Operating Norms

The disc must be mounted on the unit with logical number 0, and the tape on unit 1.

The tape unit can be either 7 or 9 track provided that the tape has been adequately labeled with the order . TLW.

At the end of the transcription the program stops on the 'HLT 2C4E'. To start the control phase it is sufficient to press the START button. If only control is desired, it is sufficient to punch the character C in column 25 of the parameter card (preceded in column 24 by the separate character "," comma).

The parameter card has the following format:

```
.ED99 ,D ,N ,I ,SSSSS ,FFFFF ,C
```

in which:

D = logical number of the disc unit
N = number of the tape unit
I = recording density (K, L, M, N)
SSSSS = sector number from which transcription must be initiated
FFFFF = number of the last sector to be transcribed
C = optional character for performing only control

f. Halts and Messages

The program provides for the following HLT's:

2C4E	signals the end of transcription. Press START to begin the control phase.
2D20	follows the message INVALID EDOS-TAPE in control phase.

The program provides for the following message:

INVALID EDOS-TAPE	the tape containing the EDOS is wrong

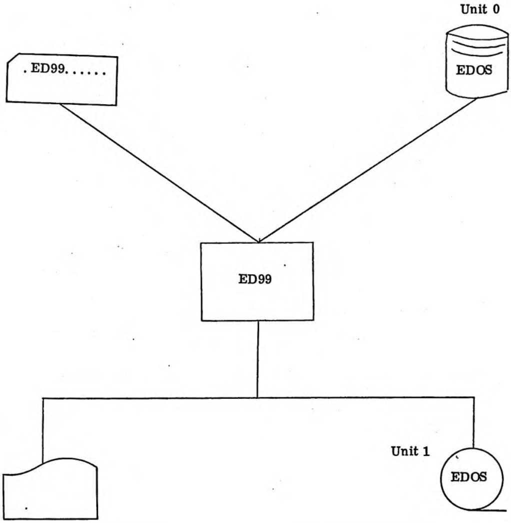


Diagram of ED99 Program Functioning

Col. 21 = ƀ (indicates that transcription is on 160 disc)
* ƀ (indicates that transcription is on 110 disc)

f. Controls

At the beginning the program verifies the parameter card, and, if there are any deviations, stops on a HLT.

g. Halts

The program provides for the following HLT's:

Operating HLT

14B4 end of job Halt

Error HLT's

In addition to the standard HLT, the following HLT's are provided for:

19E8 = the card code is not *
19F6 = tape unit not declared
1A0C = file name not declared
1A20 = parity check not requested
1A3C = density error
1A50 = there is no 2 in column 17
1A64 = disc unit not declared
1A74 = connection number of the 1st unit not declared

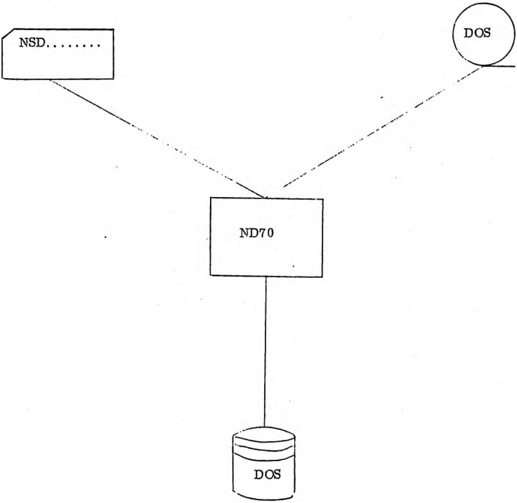


Diagram of ND70 Program Functioning

8. NS99 - EDOS Tape-to-Disc Conversion Program

a. Function

This program converts an EDOS from tape to disc when an EDOS is not available or when only 1 unit is available.

b. System's Minimum Configuration

- core store 12K
- card reader
- 1 tape unit
- 1 disc unit

c. Input Data

The input data consists of an EDOS registered on tape and the program start card.

d. Output Data

The output data is an EDOS registered on DSU110/160 disc.

e. Operating Norms

The program must be loaded in memory normally like the BOS program by pressing CLEAR, LOAD and START. It does not rewind the tape before beginning the job; the tape must have been previously rewound.

The parameter cards for execution of the conversion have the following format:

Col. 1 = * card code

Col. 2 = number of the tape unit read

Col. 3-14 = name of the file to be transcribed. It must always be the following:
SDb̸DSDb̸b̸b̸b̸b̸b̸

Col. 15 = parity check: b̸ = odd parity
0 = even parity

Col. 16 = recording density. This column may contain one of the following characters signifying:
K = 1600 bpi
L = 800
M = 556
N = 200

Col. 17 = tape control code. Must always be 2

Col. 18 = output disc unit number. It can assume values from 0 to 9.

Col. 19-20 = connection number (in hexadecimal) of the first disc unit connected to the system. (example: 10, 20, 30)

Col. 21-22 = order number of the first DSU110 disc connected to the system (for example: 01, 02, ...)

f. Halts

The program provides for the following HLT's:

140C	= card code error.	Correct card and press START.
141A	= the tape unit number in column 2 has not been specified.	" " " " "
1430	= file name wrong in columns 3-14	" " " " "
1444	= control tape code has not been specified	" " " " "
1460	= density code differs from K-L-M-N in column 16	" " " " "
1474	= GUN tape code wrong	" " " " "
1488	= number of the disc unit not specified	" " " " "
149E	= disc connection numbers not specified	" " " " "
1548	= file wrong	" " " " "
160C	= end of job	" " " " "

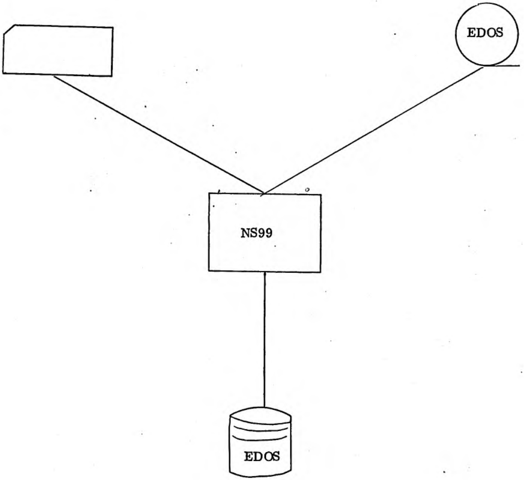


Diagram of NS99 Program Functioning

9. SF-MAINT - Program for Loading and Updating the Special File by Means of Programs Punched in H or T Code

a. Function

The program is used to load and update the Special File tape by means of cards containing the programs and subroutines punched in H or T code.

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

c. Processing Time and Memory Size

The processing time depends on various factors, among which are:

- speed of the peripheral unit used
- number of cards to be loaded

The program resides in memory between 08FC (address of installation 2300) and 1ED1.

d. Input Data

The input data consists of the cards for initialization of the program, and the information punched on cards and composing the programs and subroutines to be loaded on tape. Each program must be preceded by the relative Header Card and followed by the Program End Card. The programs must be arranged in ascending order according to "order code", punched in columns 5-8 of the Header Cards.

The card file must end with an FFFFFFFF card.

The input data can also be the file already contained in the Special File to be updated (tape unit 1), that, in the case of the first loading, must be declared absent.

e. Output Data

The output data consists of the Special File created, updated and organized as already described on tape unit 2, from a printout containing the heading of each single program followed optionally (SWITCH 1) by the list of the cards loaded.

f. Operating Norms

On the output file a check-point is registered at 3000-card intervals, which makes possible recovery by means of the order .RST. The check-point is signalled on the printer and followed by a HLT to permit separation of the cards.

The program always functions in updating. It has the following capabilities:

- Loading

  Besides the control effected on the parameter cards (header card, end program card, closing card), the records registered are card image (80 characters) on which there is no further control. It is, therefore, possible to use this program for loading on tape a card file with any format.

  With SW2 on, it is possible to load and update programs having input cards punched in T code.

- Duplication

  It is possible to obtain duplication of the Special File if, like the cards in input, only the closing card (FFFFFFFF) is read. This duplication gives the advantage of having a copy of the file without check-points which would increase the processing time of the successive phases. In addition, it obtains a list of the programs contained on tape.

- Updating

  For Special File updating is understood:

  . Substitution of the programs contained on tape by those contained on cards

  . Insertion on tape of the programs on cards

  . Queueing on tape of the card programs

  It is important to note that while for substitution the program on tape must have the same "order code", those for insertion or queueing must differ from those already on tape.

  During the updating it is possible to print (SWITCH 1) only the cards processed.

At the end of the job the following message is printed:

END OF LOADING OR UPDATING OR TRANSCRIPTION

and control is then released to the Operating System.

For accuracy control of loading it is necessary to load and start the SF-PUNCH program which has this function.

The input cards must be in the following sequence:

- . PRL order card, LBC and ƀ END cards
- header card of the first program to be loaded, inserted, substituted or queued
- program cards
- program end card (FFFF9999)
- ....
- ....
- header card of the last program to be loaded
- program cards
- program end card
- end of job card (FFFFFFFF)

g. Controls

The program verifies the header card to see that:

- it has the FFFF code
- it is a program end card (FFFF9999)
- its order number (column 5-8) is numerical
- its order number is in ascending order

Upon verification that one of these conditions is missing, the program stops on HLT to allow correction and repositioning of the card.

At the end of the job the proper message is printed.

h. Halts and Messages

The program provides for the following HLT's:

230A = header card wrong. Correct the card, reposition it on the reader and press START

00FA = check-point

The program provides for the following messages:

LOADED CARDS TOTAL NNNN	Printed when the total number of cards loaded on Special File is unequal to the number provided by the header card. NNNN indicates the number of cards actually loaded.
END OF LOADING OR UPDATING OR TRANSCRIPTION	End of job message. The Operating System is reloaded and started.

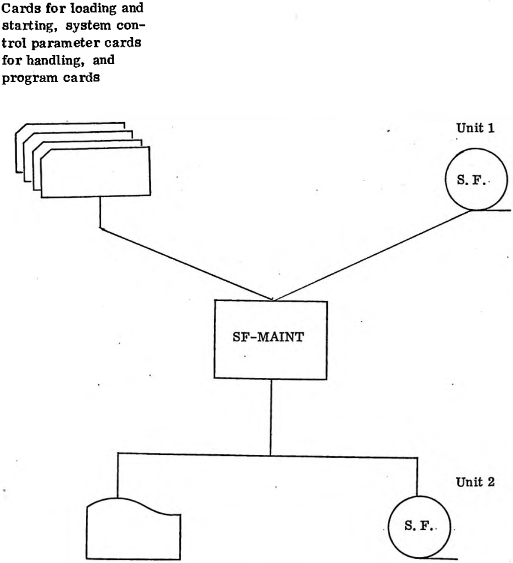

Cards for loading and starting, system control parameter cards for handling, and program cards
Unit 1
S. F.
SF-MAINT
Unit 2
S. F.

Diagram of SF-MAINT Program Functioning

10. SF-PUNCH - Program for Punching and Control of the Special File Registered in H or T Code

a. Function

The program punches and controls the software programs in H or T code loaded on the Special File tape by the SF-MAINT program.

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

c. General Information

The program is in a unique segment including the phases of punching, control and printing.

The source is in APS II language and its start address is 2300.

d. Input Data

The input data consists of the information contained on the Special File tape and parameter cards varying according to the type of job to be done.

e. Output Data

The output data consists, according to the function requested by the program, of:

- punch cards (H or T) and relative printout (program lists) in punching phase
- a printout showing the result of the comparison in control phase
- a printout with a list of the cards constituting the programs if only the printing is requested

This last printout can be obtained simultaneously with punching (option connected to SWITCH 1).

f. Operating Norms

The program makes possible punching in T code by pressing SWITCH 2 from the console.

However, if the punching is done from a file already selected by SF-SELECT, it is not necessary to press SWITCH 2 on since the test of the system description card is provided to establish the type of punching. The same applies for the control phase.

Printing of the program being punched can be executed simultaneously with punching by pressing SWITCH 1 on the console. Also the control phase can be started right after the punching phase. In fact, the program, at the end of the punching phase, stops on a waiting HLT, and by pressing START the relative control phase is loaded and started directly without requesting the matrix card.

At the end of the control phase, control is released to the Operating System.

The matrix card which specifies the type of job to be run, has the following format:

Col. 1- 4 = MMMM (card code)

Col. 5 = P : punching
= C : control
= W : printing

Col. 6 = S : the file on tape is a SF previously selected (by SFSELECT)
= R : recovery with SF previously selected by SFSELECT
= b̸ : the file on tape is a SF that has not been selected

Recovery is provided for either in the punch phase or in control phase only if there is an input file selected by SFSELECT.

In the punching phase the matrix card is necessary (P in Column 5 and R in Column 6) followed by the header card of the last program punched. In the control phase, the matrix card is necessary (C in Column 5 and R in Column 6) followed by the relative header card of the first program to be controlled.

The program provides for various detail cards according to the different functions:

1) Punching From SF Not Selected (matrix card with P in Column 5 and blank in Column 6):

   - Single Call Card (FFFF code)
   - Multiple Call Card (L code)

One single call card or more than one multiple call cards are allowed. The L code cards must end with a card having the following format:

Col. 1-8 = FFFFFFFF

2) Punching From Special File Already Selected (matrix card with P in Col. 5 and S (or R) in Col. 6):

No detail card is requested; in this case all of the file is punched in the code provided by the system description card independent of the positioning of SWITCH 2. (The optional use of SWITCH 1 is always possible.)

3) Punch Control (matrix card with C in Col. 5 and any code provided in Col. 6):

The matrix card must be followed by the programs to be controlled. All input must end with a card having the following format:

Col. 1-8 = FFFFFFFF

4) Printing (matrix card with W in Col. 5):

If there is a blank in Col. 6 of the matrix card the program provides for a single call card (the multiple call card is not provided for). If S is punched, the whole file is input.

g. Controls

In the punching phase the accuracy of the parameter card codes is controlled. If errors are found, they are signalled and the program stops on a HLT.

Before continuing to the punching, a routine from the first part of the program checks that in the system configuration being used, a punch is present. If affirmative, it provides self-compilation of the assembled subroutines; if negative, it stops and cannot continue.

h. Halts

The program provides for the following HLT's:

22EA = blocking HLT. Punch is absent; impossible to continue. Verified only when punching is needed.

230C = matrix card code error

242C = detail card code different from 'L' or 'FFFF'

283E = end of punch HLT. By pressing START the control phase is loaded and started.

29AC = the header card does not have FFFF in Col. 1-4 (in control phase)

2B52 = in control phase, a card is different from the corresponding record on file. By pressing START, control continues

2B92 = the C/A cards have code errors

2C24 = in the printing phase the detail card does not have FFFF in Col. 1-4

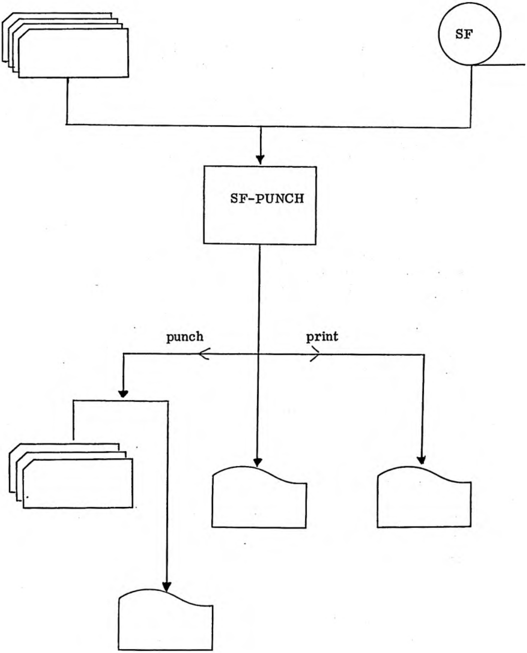


Diagram of SF-PUNCH Program Functioning

11. SFSELECT - Program for Selection and Personalization of Programs from Special File

a. Function

The program is used for selection from the software Special File (COS/BOS) of the programs and subroutines necessary for a specific system.

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

c. Input Data

The input data consists of the Special File tape containing the software program file, the system description cards (C), Master File (A) and optionally from a multiple call card (L).

d. Output Data

The program furnishes another Special File, organized like the one in input, and containing only the programs selected and personalized for a specific system.

A printout is obtained with the heading of the center and the list of selected programs.

e. Operating Norms

No recovery is provided for the program.

The input tape is mounted on tape unit 2, and the tape intended to contain the selected file in output is mounted on tape unit 1.

The card sequence for calling, loading and starting the program must be the following:

- order card . PRL, LBC and END
- eventual multiple call card
- card C and A of the specific system intended for

Provision is made for selection and personalization of only one or more programs (up to a maximum of 19). This option is made possible by means of the multiple call card (L code) that is placed in front of cards C and A. Obviously, in this case, only the programs whose "order numbers" are punched on the L card are selected and personalized.

f. Controls

The codes and sequence of cards C, A and L are controlled; in addition it is checked that in card C are present the minimal requirements of 1 printer, 1 card reader or one reader punch.

No error message is provided for. Errors are eliminated by controlling the table of the HLT's.

g. Halts

The program provides for the following HLT's:

1D0E = In the system description card (C code) the code specifying the printer is missing. Place the corrected card on the reader and press START.

1D08 = In the system description card (C code) the code specifying the reader (or reader punch) is missing. Place the corrected card on the reader and press START.

1CFA = The card C code is wrong. Place the corrected card on the reader and press START.

1B02 = The card A code is wrong. Place the corrected card on the reader and press START.

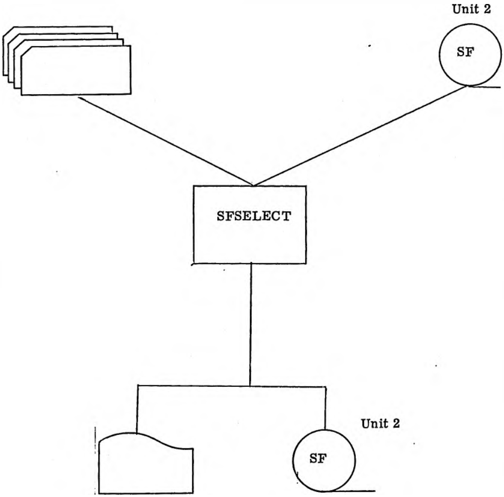


Diagram of SFSELECT Program Functioning

12. TADI - DOS Tape-to-Disc Conversion Program

a. Function

The program makes possible the transcription on disc of an SD (or MD or LD), queued after an ST (or MT), or the transcription on disc of an SD (or MD or LD) previously registered on tape by means of program DITA.

b. System's Minimum Configuration

- core store 8K
- card reader
- printer
- 1 tape unit
- 1 DSS130 disc unit

c. Input Data

The input data consists of a tape containing DOS, the eventual disc labelling cards, and the cards for loading and starting the program.

d. Output Data

The output data consists of the disc on which the input tape is transcribed.

e. Operating Norms

The program can be resident on disc (SD-LD-MD) or on tape (ST-MT).

TOS will be used, especially in cases where the center lacks an SD (first software distribution).

In such case it will be possible to use the orders .DNA, .IND, and .FLW of the ST.

The ST (or MT) on which the data to be transcribed is found, must be mounted on the tape unit with logical number 8, while the disc on which transcription is to be performed must have logical number zero. In the case that the SD is on a work tape, it must be mounted on tape unit 1.

The cards for calling or loading and starting the program must be in the following sequence:

```
.PRLTADI
ɃEND
```

The .PRL card must contain the following parameters:

Col. 17 : * asterisk

Col. 18 : - b̸ = the SD to be transcribed on tape is queued after the ST mounted on Unit 1
  - * = the SD to be transcribed is found on a work tape mounted on Unit 1
  - other characters: the SD is found queued after an ST mounted on tape unit 8.

Col. 20 : recording density:
  K = 1600 bpi
  L = 800
  M = 556
  N = 200

The disc on which the transcription must be executed must be devoid of files. It may or may not be labeled. For transcription on an unlabeled disc, order sequence is:

```
.DNA
.IND
.PRLTADI
END
```

For transcription on a labeled disc, order sequence is:

```
.DNA
.PRLTADI
END
```

f. Halts

The program provides for the following HLT:

1766 = wrong tape

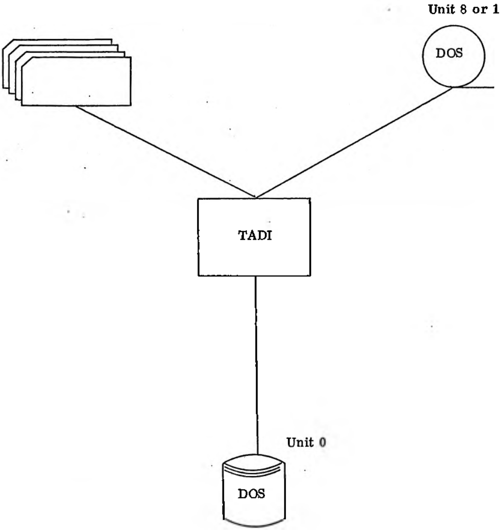


Diagram of TADI Program Functioning

13. TT-COPY - Program for Duplication of the Transport Tape

a. Function

The main purpose of the program is duplication and verification of a Transport Tape generated with the TT-MAINT program. In addition, it can duplicate and control any standard or non-standard tape of the GE-100 line.

The tape can have any organization provided that there are no blocks with more than 4096 characters or less than 20 characters, and no TM different from the GE-100 line standard.

The duplication can be performed on any type of controller (excluding the MTC 104) and at any density. On the contrary, 9 and 7-track tapes that require packing and unpacking operations cannot be duplicated.

The same considerations also apply for the control.

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 magnetic tape units

c. Input Data

The input data consists of the Transport Tape to be duplicated and the cards for loading and starting the program.

d. Output Data

The output data consists of the duplicated Transport Tape and messages on the printer (beginning or end of duplication, beginning and end of control, errors).

e. Operating Norms

The program can reside either on the System Disc, on System Tape contained in the TT, or on another System Tape.

At the end of duplication the program rewinds the tape and stops on a HLT. By pressing START, control begins. If control results are negative, error signals are printed, the tape is rewound, and the program stops on a HLT. Press START again to reload and start the duplication.

If during the control no errors are detected, the program halts at the program start address where it is possible to substitute the TT duplicated and controlled with another intended to contain a successive TT.

The program can also execute control only.

The cards for calling and loading and starting the program must be in the following sequence:

- order cards . PRLTT-COPY and relative b̸END

The order card . PRLTT-COPY has the following format:

Col. 17 = * (asterisk)

Col. 18 = blank for duplication; any other character for control only

Col. 19 = recording density of the input TT

Col. 20 = recording density of the output tape. The fields may contain one of the following characters signifying:

K = 1600 bpi
L = 800
M = 556
N = 200

Col. 21 = unit number of input tape

Col. 22 = unit number of output tape

Col. 23-31 = end of file label or end of reel label (decimal)

Col. 33-34 = length of label indicated in Col. 23-31, maximum 9 characters (hexadecimal)

Col. 35 = parity check b̸ = odd parity
0 = even parity

Columns 19-22 are mandatory, the others are optional. If Col. 23-35 are blank, the Transport Tape having the final label * ETT is duplicated, and the control type is parity. In the case where the tape to be duplicated is not the TT, Col. 23-35 will contain the end of file label present in the tape and the type of control.

f. Halts and Messages

The program provides for the following HLT's:

29C8 = program beginning HLT to await end of control

29C2 = end of duplication HLT. Press START to execute control

2982 = error control HLT. Press START to execute new duplication

- The program provides for the following messages:

- START DUPLICATION	printed at the beginning of duplication
- END DUPLICATION	printed at the end of duplication only in the case that this occurs regularly. Press START to load and start control
- START CONTROL	printed at beginning of the control
- END CONTROL	printed at end of control only in the case of positive results and the tapes are closed regularly. Press START for loading and starting duplication
- INVALID TRANSCRIPTION	printed during the control in the case of negative results. Press START to reload and start duplication
- INVALID LABEL LENGTH	in Col. 33-34 of . PRL card no length has been specified even though Col. 23-31 are different from blank
- ILLEGAL PARITY CHECK	the characters indicating the type of parity check are wrong
- ILLEGAL LABEL	the label length has been expressed in Col. 33-34 of the . PRL card, but Col. 23-31 are blank

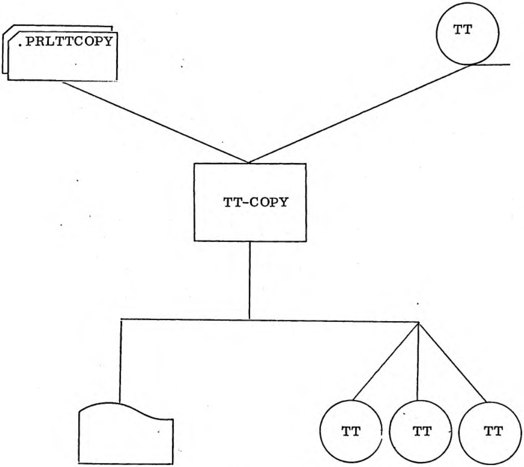


Diagram of TT-COPY Program Functioning

14. TT-MAINT - Program for the Generation of the Transport Tape

a. Function

The program is used to generate a Transport Tape intended to contain the various software files for distribution. It offers the possibility of reading and writing tapes with any density.

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

c. Input Data

The input data consists of files on tape to be loaded on Transport Tape, cards for loading and starting the program, and parameter cards.

d. Output Data

The output data consists of the Transport Tape on which the various files have been loaded, and a printout with the list of files loaded on the TT.

e. Operating Norms

Recovery is not provided for, but it is possible to queue one or more files after a TT (closed with the *ETT label.

The program can reside either on System Tape or on System Disc. The S. T. must be mounted on Unit 8.

The TT to be generated must be mounted on Unit 1 and the other files on the tape unit whose numbers are specified on the relative parameter cards. At the end of the loading of each single file the program stops on a HLT to allow (if decided) swapping of the file already loaded with the successive file to be loaded.

The cards used to load and start the program must be in the following sequence:

- .PRL order card and relative ƀEND
- data card
- file card
- generation end card

The parameter cards have the following format:

- Data Card

  supplies the data (F. W.) necessary to generate the TT

  Col. 1 = * (asterisk)
  Col. 2-5 = date
  Col. 6-7 = number of fiscal week.
  Col. 10 = b̸ : normal execution (any character)

- File Card

  contains data relative to the files to be loaded

  Col. 1 = * (asterisk)

  Col. 2-4 = initial indicating the file to be loaded, represented by the following characters:
    TOS = Tape Operating System
    DOS = Disc Operating System (used also for DOS II)
    ETO = Extended Tape Operating System
    EDO = Extended Disc Operating System
    ATF = Extended APS and TAB 2 Compilers
    SFX = Special File (X can assume a value of 0-F)

  Col. 5 = tape unit number on which the file to be loaded is mounted (can assume a value of 2-7 because the Transport Tape is mounted on Unit 1 and the ST on Unit 8)

  Col. 6-7 = number of the fiscal week

  Col. 10 = recording density of the file to be loaded

  Col. 11 = recording density of the TT to be generated. The recording density must be expressed by means of the usual codes:
    K = 1600 bpi
    L = 800
    M = 556
    N = 200

  Col. 12-60 = description of the file (only if it is a file registered on Special File)

- End Generation Card

  Col. 1 = *
  Col. 2-4 = ETT (End Transport Tape)

f. Controls

The program verifies the "file card" for:

- presence of card code *
- tape unit number comprised between 2-7

The program does not provide for error messages; it is therefore necessary to look up the table of halts and the reasons for them.

g. Halts

The program provides for the following HLT's:

1A3A	= data card error. Place the corrected card on the reader and press START
1A40	= file card error: the tape unit number is not contained between those anticipated. Place the corrected card on the reader and press START.
1A46	= file card error: the initial of the file is not contained between those anticipated. Place the corrected card on the reader and press START.
1A4C	= waiting HLT: loading of a file is terminated. Press START to load the successive file.

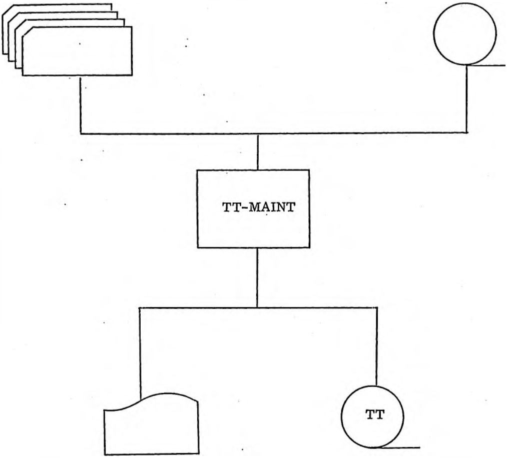


Diagram of TT-MAINT Program Functioning

15. TTSELECT - Program for Extraction of Files from the Transport Tape

a. Function

The program is used to extract files contained in the Transport Tape. It is possible to read and write tapes with any recording density.

b. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

c. Input Data

The input data consists of the Transport Tape that contains the files to be extracted, the cards for loading and starting the program, and the parameter cards.

d. Output Data

The output data consists of the various files selected from the TT and a printout summarizing the files extracted.

e. Operating Norms

No recovery is provided for.

The first file on the Transport Tape is always a TOS or an ETOS. The extraction of the first file is not normally provided for, in as much as it is directly usable (on condition that there are no modifications of the contents before the remaining files are extracted). However, in the case that the configuration of the installation does not allow its utilization, it is necessary to extract it, personalizing the System.

Following the personalization the program TTSELECT, that extracts the files by means of the parameter cards, can be loaded and started. The files can also be extracted individually.

If the TT is used to load and start the program, a HLT is provided at the beginning of the program to allow the exchange (in the extraction phase the Transport Tape must be mounted on Unit 1).

The program can be inserted also on DOS; after the first distribution, the direct use of the program resident on S. D., or the procedure already described, will be chosen by the user.

The call cards for loading and starting the program must be in the following sequence.

- . PRLTTSELECT order card and relative ƀEND
- file cards
- end of extraction card (*ETT)

When the *ETT card is read, the Transport Tape is rewound and the control released to the Operating System.

The parameter cards have the following format:

- File Card

  contains the data relative to the file to be extracted

  Col. 1 = * (asterisk)

  Col. 2-4 = initial of the file to be extracted (the initials are the same provided in the file card of the TT-MAINT program)

  Col. 5 = tape unit number from which the file is to be inserted

  Col. 10 = Transport Tape recording density

  Col. 11 = recording density designated for the output file. The recording density is expressed by means of the following customary codes:
  K = 1600 bpi
  L = 800
  M = 556
  N = 200

- End of Extraction Card

  Col. 1-4 = * ETT

f. Controls

The program verifies the "file card" codes and that the output unit number is contained between 2-8.

The program does not provide for error messages; it is therefore necessary to look up the table of halts and the reasons provided for them.

g. Halts

The program provides for the following HLT's:

1A3C = program beginning HLT. Exchange tapes and press START.

1A3C = waiting HLT at end of a file extraction. Substitute the reel intended to contain the successive file and press START

1A42 = parameter card code is wrong

1A48 = output tape unit number is not comprised between 2-8

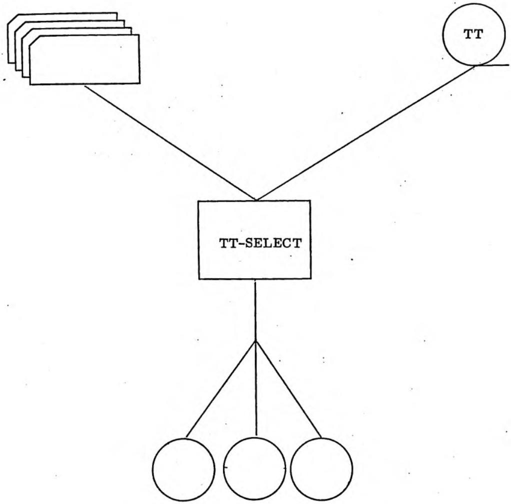


Diagram of TT-SELECT Program Functioning

III. APPENDIX

HANDLING PROGRAMS NOT DIRECTLY CONNECTED TO THE SYSTEM

In this section of the manual are documented other programs used for handling software which are not part of the system previously described. Among these, only the program HEADER WRITE from the software handling system is used also for the DSU160B, DSU160C and DSU110 disc header registrations provided for by the system.

A. .EPP - Program for the Extraction on Tape of a Source Program from a Source Program File

1. Function

The program is used for the quick extraction on tape of a source program from a source program file to obtain a compilation.

2. Other Information

Because this program uses a rapid search method, the .EPP is used rather than the .GAS if an updated source program file is used.

The .EPP program functions under TOS-ETOS. If the program is loaded on SD using mixed systems having at least 1 unit per file, it makes possible APS compilation under DOS.

3. System's Minimum Configuration

a. Under TOS-ETOS:

- core store 12K
- card reader
- printer
- 4 tape units (1 unit for the System Tape; 2 units for the work tapes intended for the compilation of the source program extracted; 1 unit, usually unit 5, on which the file of source programs is mounted)

b. Under DOS:

- core store 12K
- card reader
- printer
- 1 DSU130 disc unit
- 1 tape unit, usually unit 5, on which the file of source programs is mounted

4. Input Data

The input data consists of the program to be extracted from the source program file (Unit 5) and the program call card.

5. Output Data

The output data consists of the program extracted which is to be compiled, and the eventual messages on the printer.

6. Operating Norms

The source program file is usually mounted on tape unit 5.

The program searches for the source requested by means of reading the tape continuously forwards or backwards and based on the results of comparison of the identification codes of the first and last records of each block.

The search can begin from any tape position; nevertheless the program does not execute any OPEN or CLOSE of the file, and the tape is never rewound.

When reading the tape backwards, the program can function correctly only reading blocks with a length of 4005 characters. If the length differs it must be re-compiled changing the definition of the read area.

The first source program card must contain APS = 00001 in Col. 2-6.

The parameter card for calling the program has the following format:

Col. 1- 4 : .EPP

Col. 5-12 : code of the program or subroutine to be extracted from the file for successive APS compilation

Col. 13-14 : not used

Col. 15 : =b̸ : tape on Unit 5
≠b̸ : unit number containing the file

Col. 16-80 : not used

7. Controls

Verifies (before the END) the existence of a common card stating the data (5 numerical characters) in Col. 32-36.

8. Messages

The program provides for the following messages:

8211 * PROGRAM NOT FOUND

8212 * END OF REEL ON WT1

8213 * INSUFFICIENT WORK AREA ON S. D.

8299 * END OF SOURCE PROGRAM

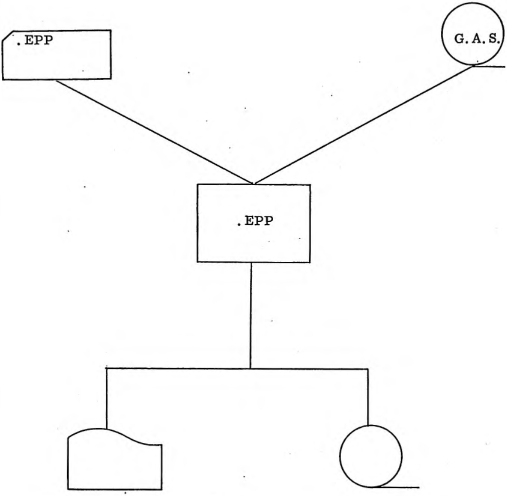


Diagram of .EPP Program Functioning

B. .EXSP - Program for Extraction on Disc of a Source Program from the .GAS Tape

1. Function

The program makes it possible to extract a source program from the tape containing it, by means of the order .GAS for the purpose of effecting its compilation.

2. Miscellaneous Information

The subroutine YBKRD is used for backward reading of the G. A. S. tape.

The program functions under DOS II-EDOS.

3. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 1 tape unit
- 1 disc unit or 2 in the case that the output disc does not coincide with the basic disc

4. Input Data

The input data consists of the source program registered on the G. A. S. tape (Unit 5) which is to be extracted, and the order cards for calling the program.

5. Output Data

The output data consists of the program extracted on disc and the resulting error messages.

6. Operating Norms

The program is called with the .EXSP order by which is obtained the extraction of a source program from a GAS tape on the free zone of a disc for successive compilation.

The input tape must be mounted on the unit with logical number 5. Only 1 output disc is necessary if the extracted program is to be registered on the basic disc; however, 2 discs are necessary if it is to be registered on a disc other than the basic disc.

The program effects a non-standard opening of the tape and a forward and backward search according to the positioning of the program codes desired.

It is possible to extract only 1 program at a time, and the rewinding, which must be manual, must be done only at the end of all the extractions.

The order card for calling the program has the following format:

Col. 1- 5 : . EXSP

Col. 6 : ,

Col. 7-14 : identification code for the program to be extracted

Col. 15 : number of the disc unit on which the source is to be inserted

Col. 16 : = W, shifting of the source at the end to the free zone of the disc
≠ W, shifting not requested

7. Controls

The program verifies that the free zone on disc is at least 6 cylinders and transcribes the program. At termination it verifies that the card prior to the Program End Card is an asterisk card and that the date in Col. 32 is numerical. If affirmative, it puts the new date in positions 42-46; otherwise, a message appears on the printer and the program proceeds.

In the case of a shift in the final zone, the program verifies that such zone is at least 2 times larger than that occupied by the source. If negative, a message appears on the printer stating the impossibility of the shift.

8. Messages

The program is characterized by program number 88 and provides messages with numbers 201, 202, 203, 204, 205, 206, 207. They have the following significance:

*OS*88201*	INSUFFICIENT WORK AREA ON DISC Y* The work area is less than 6 cylinders.
*OS*88202*	PROGRAM NOT FOUND *YYYYYYY The program searched for is not present on the GAS

After these messages the program goes into abort.

*OS*88204*	NOT POSSIBLE SHIFT IN FINAL ZONE OF D. Y - POSSIBLE COMPILATION WITH WORK DISC* It is not possible to shift the source in the final part. If it is requested, after compilation, a W D. occurs.
* OS*88205*	INVALID OR MISSING SOURCE DATE * 00000 NAME DATE CODE The first end card lacks the (*) in Col. 17 or the numerical date in Col. 32. The date of the .INT resides in memory positions 42-46 (the message 206 does not appear).

After these messages instructions are needed for the program to proceed.

* OS*88206*	CARD DATE The * card is printed with the date inserted in the .INT positions (42-46 of the memory).
* OS*88207*	END OF PROGRAM The end of program message is printed when the program is terminated correctly. Control is then passed to the supervisor.

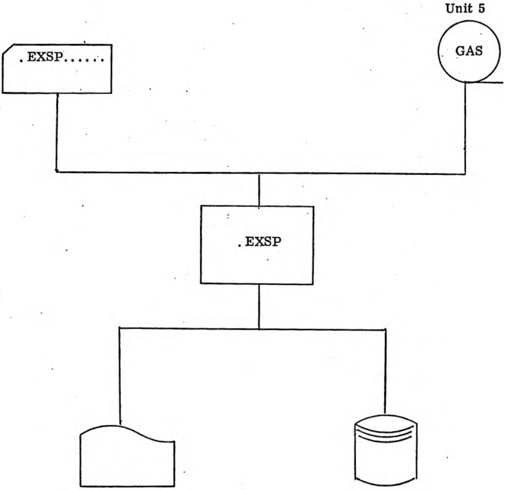


Diagram of . EXSP Order Functioning

C. HEADER/WRITE 110/160 - Card Program for Writing Disc Headers (DSU160B, DSU160C, DSU110)

1. Function

The program makes it possible to write the disc headers DSU160B, DSU160C, DSU110 using directly the card pack containing the program itself.

2. System's Minimum Configuration

The program functions either with the GE-115 central unit or with the GE-120/130 central unit.

- core store 8K
- card reader
- printer
- 1 disc unit (DSU160B/C - DSU110)

3. Input Data

The input data consists of the cards of the program punched in binary mode.

4. Output Data

The output data consists of the disc on which the headers have been written and messages on the printer.

5. Operating Norms

The program is punched on cards in binary mode and no parameter relative to the configuration of the machine is necessary. It follows, in fact, an automatic search of names of the peripheral, giving some messages on the printer.

The first 4 cards of the deck are 4 loaders, having the capacity to load the program with 4 different card readers; they are:

- the card having 3 punched in Col. 3 is the loader to use on LP in T code
- the card having 4 punched in Col. 3 is the loader to use on LP in H code
- the card having 8 punched in Col. 3 is the loader to use on LS in H code
- the card having 9 punched in Col. 3 is the loader to use on LS in T code

After the choice of a loader relative to the reader present in the installation, put the card deck on the reader without the last card and press OPERATE.

The pre-selected disc unit must be turned off and the printer must be in STAND-BY.

Pressing CLEAR-LOAD-START (on the console) loads the first 89 cards; after that, turn on OPERATOR-CALL; it is necessary then to put the printer in OPERATE. From this moment on certain messages which must be observed and followed appear on the printer.[*] Following these messages the program stops on HLT 11AC.

Next put the reader in OPERATE and press START; observe the messages on the printer.

At HLT 1348, follow the instructions on the printer.

After loading the remaining cards there is a HLT at 0964; at this point put the last card in the reader and put it in OPERATE; press START. This is done to obtain the labeling of the disc.

At the end the program halts at 0D96. (To repeat the operation insert SW2 and press START).

6. Halts

The program provides for the following HLT's:

11AC - search and verify printer and central unit (see messages on printer and press START)

1348 - search and verify disc unit (see message and press START)

0964 - wait for labeling card

10B6 - end of job

Error HLT's

0025 - reading card error during loading (reload the program)

0918 - reader in STAND-BY (put in OPERATE and press START)

0F9A - the printer must be in STAND-BY (reload the program)

02AE - printer in STAND-BY (put it in OPERATE and press START

08CE - labeling card reading error (replace the card on the reader and press START)

145C - the automatic search of the disc unit has not functioned (observe message on printer).

---

[*] Disregard the message UNTHREAD THE PLATE A20 on GUD 030 (only for technicians).

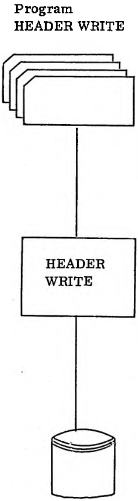


Diagram for HEADER WRITE Program Functioning

D. PRINTSTL - Program for Printing of the STL Contained on Tape

1. Function

The program makes possible the printing of the transmission letter contained on the tape generated by the SF-MAINT program.

2. System's Minimum Configuration

- core store 12K
- card reader
- 1 printer
- 1 tape unit

3. Input Data

The input data consists of a file on tape mounted on Unit 1 which is the output of the SF-MAINT program, and the cards for loading and starting the program.

4. Output Data

The output data is the STL printed on the printer.

5. Operating Norms

The input tape is mounted on the unit with logical number 1. If SWITCH 1 is inserted, all of the transmission letter is printed; if SWITCH 1 = OFF, only the last updating of the STL is printed.

The cards for loading and starting the program have the following format:

```
.PRLPRINTSTL
    LBCPRINTSTLFLI1  000001  703041  NNNNNNL
END
```

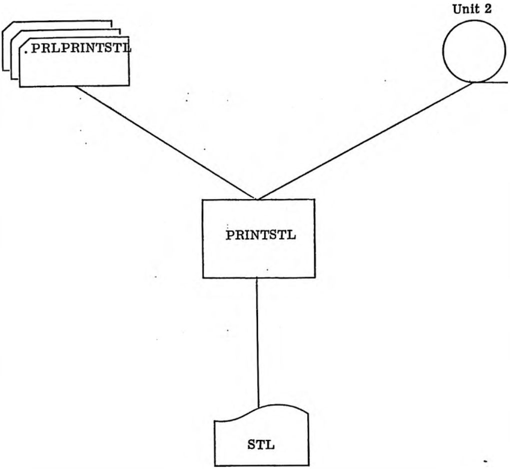


Diagram of PRINTSTL Program Functioning

E. SEVENINE - Program for the Conversion from 7 to 9 Track Tapes Written on GE-400

1. Function

The program makes it possible to convert a 7-track tape written on a GE-400 computer (400 MTPS software or other types of software for the GE-400) to a 9-track tape to be used on the GE-400.

2. Other Information

The input tape must end with the label EOR or EOF. The program is in APS II source language and uses the subroutines YBIND, YDECB, YPK68. This program has been punched with the order . PPG executed by means of cards.

3. System's Minimum Configuration

- core store 12K
- card reader
- 2 tape units
- 2 printers

4. Input Data

The input data consists of a 7-track tape and cards for loading and starting the program.

5. Output Data

The output data consists of the 9-track tape for the GE-400 resulting from the conversion.

6. Operating Norms

The input tape must be put on Unit 1 (7 track) and the output tape on Unit 2 (9 track).

The order cards for loading and starting the program have the following format:

Col. 1-12 = PRLSEVENINE
Col. 17 = *
Col. 18 = input tape recording density, expressed by one of the following customary codes:

K = 1600 bpi
L = 800
M = 556
N = 200

Col. 19 = output tape recording density, expressed by one of the following customary codes:

K = 1600 bpi
L = 800
M = 556
N = 200

The LBC cards are not requested, and it's not necessary that the output tape be labeled.

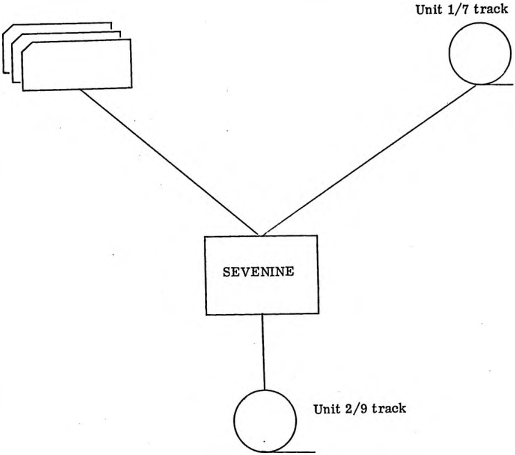


Diagram of SEVENINE Program Functioning

F. TT-COPY2 - Program for Duplicating H-200 Software Using a GE-100 Line Computer

1. Function

The program is used to duplicate H-200 software by means of a GE-100 line computer.

2. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units

3. Input Data

The input data consists of files of H-200 software and the cards for loading and starting the program identical to those used for the TT-COPY program. (The only exception is the .PRL card which for this program will be .PRLTT-COPY2).

4. Output Data

The output data consists of the H-200 software duplicated on tape.

5. Specific Considerations

The TT-COPY2 program is identical to the TT-COPY program. The only difference is that in the TT-COPY2 program the subroutine YTAPE has been assembled, modified to eliminate the CAPE test to make possible the duplication of tapes with records of less than 18 characters. This modification has been necessary to permit duplication of systems and tapes used from the Honeywell series. In the TT-COPY2 program, the YTAPE subroutine has been queued with the name XTAPE.

The information regarding the Operating Norms and Halts and Messages for the TT-COPY2 program are the same as for the TT-COPY program. The user, in addition to that stated above for the TT-COPY2 program, will be able to make use of the documentation relative to the TT-COPY program, present in the same manual, to extract all the information necessary for the functioning of the TT-COPY2 program.

G. .GAS - Program for Creating and Handling a Program File in APS Source

1. Function

The program makes it possible to create a source program file in APS language loading the programs on magnetic tape (Unit 4). It also makes it possible to handle the programs already existing on file by means of the following functions: cancellation; extraction on tape; punching or printing; updating.

2. System's Minimum Configuration

- core store 12K
- card reader
- printer
- 2 tape units
- 1 card punch (optional)

3. Input Data

For loading, the input data consists of:

- APS source programs; a special data movement card called pilot N card; cards for loading which follow the pilot card.

For cancellation, extraction or updating of a file already created, the input data consists of:

- the file tape mounted on Unit 4; special data movement cards respectively called pilot C, X, P cards; detail cards that follow the pilot cards (used only for updating).

4. Output Data

For loading, the output data consists of tape file GAS that has been created from a list in the cards loaded.

For cancellation or updating the output data consists of a file updated or records cancelled on Unit 5 and a list of programs eventually loaded.

For extraction, the output data consists of: a tape containing the extracted program (Unit 1), or punch cards of the extracted program on the punch and the relative list of programs on the printer, or the list of programs for which extraction has been requested on the printer.

5. Operating Norms

a. Loading

The tape intended for containing the file is mounted on Unit 4. The APS programs to be filed are read from the card reader. Each APS source program must be preceded by the pilot card and followed by a final card *****.

The pilot card has the following format:

Ncccccccc

where N is the character distinquishing the pilot card to perform the loading; cccccccc is the APS identification code of the source program to be loaded.

The detail cards have identifying codes equal to those specified in the pilot card and progressive sequence numbers attributed to the program. The code and original sequence number can be wrong or different from those specified in the pilot card: they are reported in the list of cards loaded, in which the eventual sequence errors are also shown.

The APS identification code of the source program to be loaded is indicated with

cccccccc

and with

pprrr

the APS sequence number of the records of the same program.

The final card has the following format:

```
Col. 1     Col. 5
    *****.
```

b. Cancellation

The input file tape is mounted on Unit 4. The output tape, intended for containing the file on which the cancellation has taken place is mounted on Unit 5.

The pilot card has the following format:

Ccccccccc

where C is the character of the pilot card intended to perform the cancellation; cccccccc is the APS identification code of the source program to be cancelled.

A cancelling card follows a loading card that carries the same identification code producing the total substitution of a program already existing on file.

c. Extraction

The input file tape is mounted on Unit 4. The extraction can be on magnetic tape (Unit 1), on the printer, or on the punch and printer.

The pilot cards have the following format:

Xccccccccb̸	to perform the extraction on magnetic tape (Unit 1)
Xcccccccc1	to perform the extraction on printer
Xcccccccc2	to perform the extraction on punch and printer

The partial punching of a source program can be requested in card X by putting:

Col. 21-25	number of the first card to be punched
Col. 26-30	number of the last card to be punched

d. Updating

The input file tape is mounted on Unit 4. The output tape, intended for containing the updated file, is mounted on Unit 5.

The pilot cards have the following format:

Pcccccccc0	extraction on Unit 1 only of programs modified during the updating
Pcccccccc1	updating
Pcccccccc2	updating with extraction of the program on card punch and printer

where P is the character distinquishing the pilot cards intended for the updating, cccccccc is the APS identification code of the source program to be updated.

The pilot cards must be followed by the detail cards that specify the the type of program updating, that is:

1) substituion of a record
2) elimination of a record
3) insertion of one or more records between 2 successive records of the program

They have, respectively, the characters S, E, I in Column 1. These cards must have the same identification code specified in the pilot card and carry the sequence number of the record to be modified or eliminated (cases a and b) or of the record preceding those inserted (case c). If the identification code does not coincide with that of the pilot card, an error message is printed followed by the printing of the card being examined and the requested updating is not accomplished. In the case of insertion, the cards are disregarded until the new I, E, S card or until there is a new pilot card.

The detail card for the substitution of a record has the following format:

Scccccccpprrr

The sequence number is that of the record that must be substituted. This last is printed with the message: RECORD DA SOSTITUIRE; the substituting card is printed after the message SOSTITUZIONE.

The detail card for elimination of a record has the following format:

Epprrrp'p'r'r'r'cccccccc

in which
pprrr = 1st record to be eliminated
p'p'r'r'r' ≠ b̸b̸b̸b̸b̸
= last record to be eliminated

The sequence number is that of the record that must be eliminated. This record is printed preceding the signal ELIMINAZIONE.

The detail card for insertion of the record has the following format:

Ipprrrcccccccc

It is followed by one or more APS cards ending with a card with * in Col. 1. The sequence number is that of the record behind which the APS cards are inserted.

After the message "INSERIMENTO" are listed the cards inserted with a printout analagous to that for loading. The lack of the * card is signalled by the proper error message:

* CARD MISSING

Whichever updating is requested for the records of the updated program the program assigns a progressive sequence number.

The eventual .APS cards are disregarded. The presence of a foreign card is considered as a detail card, not preceded by a pilot card. In this case it has the proper message:

N/P CARD MISSING

and the elimination of all cards up to the next pilot card. The data movement card must end with a card having Z punched at least in the first 9 columns.

6. Halts and Messages

The program provides for the following messages:

CARD C/N/P/X - PROGRAM CODE OUT OF SEQUENCE	Printed in case of error in the code order progression of the pilot card, and is followed by the printing of the respective wrong pilot card. The program stops on HLT.
REMOVE DETAIL CARDS UP TO FIRST C/N/P/X CARD	Printed after the preceding HLT. In case this order is not followed, the same program provides for elimination of the detail cards up to the next pilot card.
E/I/S CARD-OUT OF SEQUENCE	Printed in updating in the case of errors in the sequence of the records to be updated, and is followed by the printing of the wrong detail cards.

```
pprrr    ERR. SEQ.   ------ -- - --   cccccccc
(input)  (sequence   record loaded    (input)
         error       on the output
         message)    tape
```

Printed when the code and sequence number of a detail card are wrong or different from that specified in the pilot card. They are reported in the print-out of loaded cards, which also shows the eventual sequence errors.

N/P CARD NOT FOLLOWED BY DETAIL CARD	In the case of loading or updating where the necessary detail cards are missing
C/P/X CARD - PROGRAM CODE NOT IN FILE	The processing of a program has been requested which is not in the file. The message follows the printing of the pilot card.
PUNCHING IMPOSSIBLE	The extraction requested to be punched is not feasible. The program is only listed.
E/I/S CARD - PROGRAM CODE DISAGREES WITH CARD "P"	The detail card for updating a program has the identification code different from that of the pilot card. Printing of the wrong cards follows.
E/I/S CARD - NON-EXISTENT NUMBER - LAST NUMBER nnnnn	The detail card for updating the program has a non-existent sequence number. The printing of the card being examined follows.
* CARD MISSING	* card that must close the APS program in which an insertion is desired, is missing.
N/P CARD MISSING	In the case of insertion, a foreign card has been encountered.
PROGRAM ALREADY IN FILE	The loading of a program already existing in the file, has been requested. Printing of the pilot card follows.

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GE-130

ETOS - Extended Tape Operating System

Operator's Reference Manual

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PREFACE

This manual is produced by General Electric Information Systems Italia. The terms used conform to the standard IFIP/ICC terminology.

Suggestions and comments pertaining to form, content, purpose, or use of the manual are invited. The Document Review sheet in the back of the book is provided for this purpose.

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INTRODUCTION

This manual provides the operating procedures needed to run ETOS (Extended Tape Operating System) programs in GE-130 systems. The material is presented in three parts.

I. GENERAL OPERATING PROCEDURES
This part contains instructions for system start-up and shut-down, and on the general applications of ETOS.

II. INDIVIDUAL OPERATING PROCEDURES
This part covers the operating procedures for the individual ETOS programs.

III. APPENDIXES
These contain ancillary information pertaining to system operation in condensed form for quick reference.

This manual is written for use by Operators. More detailed information on ETOS, including formats of Parameter cards and program tapes, is contained in the ETOS Programmer's Reference Manual. A listing of other prerequisite and related reading will be found in Appendix B.

I. GENERAL OPERATING PROCEDURES

A. ETOS CONCEPTS

1. Definition

ETOS is a comprehensive set of programs used for operating GE-130 Magnetic Tape-oriented systems. It is used primarily for source program translation and debugging, and in general, for controlling day-to-day operation of the system.

2. Program Types

The programs are divided into three types:

Type 1 - ETOS programs
Type 2 - Subroutines (S/R's)
Type 3 - User (and Utility) programs.

The ETOS programs are essentially the Order programs and the Supervisor. The Order programs are standard programs which are selected by the User to direct the operation of the GE-130, from program translation and debugging, to the execution of User (and Utility) programs, and the maintenance of the software library.

The Supervisor is the controlling part of ETOS, since it processes the Order programs and performs the physical Input/Output (I/O) operations. S/R's are program sequences for handling repetitive tasks.

User programs are those developed by the User for his special needs. Utility programs are designed to perform media conversion operations.

3. Program Tapes

ETOS operation is based upon the use of three program tapes:

System Tape (ST)
Library Tape (LT)
Master Tape (MT)

plus two or three Work Tapes (WT's).

The ST is the basic program tape, containing the complete Type 1 and 2 software system. The ST is used mainly to compile and debug the Type 3 programs that will be required in normal operations.

When the Type 3 programs have been made ready for use, they are stored in the LT. From the LT, they are transferred to the MT on an as-needed basis, and combined with the ETOS programs from the ST. In this way, a sequenced series of programs is provided for use during a specified work schedule or period.

The WT's are used for storing intermediate data or program files. At least two WT's (WT1 and WT2) are required in an ETOS environment, and WT3 may be included if needed.

4. Operating Modes

The system may operate under control of either the ST or the MT, as required by the user. Thus two operating modes are defined:

System Tape Mode (STM)
Master Tape Mode (MTM)

STM is used primarily for compiling and debugging User programs. At the end of each program processed in this mode, control is transferred back to the Supervisor.

MTM is the normal mode for daily operations since each program contained in the MT is followed by a special program, the Monitor, which "chains" programs to provide continuous processing.

B. INPUT CARDS AND ORDER PROGRAMS

To obtain service from the system, the operator uses first a "Pilot 0" card (to start ETOS) then selected sets of Parameter cards (to call out and execute the desired Order programs).

1. Pilot 0

This card contains the initial program to start the system under control of either the ST or MT. It is essentially a fixed program, the only variable being the physical name of the tape unit on which the ST or MT is mounted. The format of this card is shown in Appendix D.

2. Parameter Cards

Each set of Parameter cards consists of:

One Order card - always present.
One or more Detail cards - where applicable.
One End card - where applicable.

The Order card specifies the Order program to be executed by ETOS. It is identified by a period (.) in column 1 of the card, and by the name of the Order program in cols. 2 to 4 (for example: the "Program Load" Order program is identified as ".PR L").

Detail cards are always required for some Orders, and are optional in others. They provide further specifications on the program to be executed. Detail cards are identified by a name in cols 2 to 4. Col. 1 is blank (b̸).

End cards signal the termination of the Detail cards. They are also required when the Detail cards are optional but not used. They are identified by the name "END" in cols. 2 to 4, and col. 1 is blank (ƀ).

C. OPERATOR'S CONSOLE AND PANELS

1. Operator's Control Console

The Operator's Control Console (CPU Console) is contained in a free-standing cabinet which also houses the Maintenance Panel (used only by Service Engineers). The control pushbuttons and indicator lamps, and the program indicators are described below.

NOTE: Some terms used here (identified by an asterisk) are used only in programming. If definitions are desired, they will be found in the GE-130 Reference Manual.

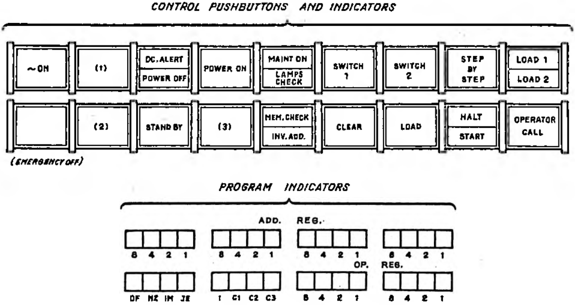

FIGURE 1 - OPERATOR'S CONTROL CONSOLE

a. Control Pushbuttons and Indicator Lamps

∿ ON	Pushbutton	Turns on AC power to the system.
(Not Labelled)	Red Pushbutton	Emergency off button. Turns off AC power to the system. Located directly under the ∿ ON pushbutton.
POWER ON	Pushbutton	Turns on DC power to the system.
	Yellow Lamp	Lit when DC power is on.
POWER OFF	Pushbutton	Turns off DC power to the system.
	Yellow Lamp	Lit when DC power is off and AC power is on.
DC ALERT	Red Lamp	When lit, indicates overheating in the CPU. DC power goes off.
(1)(2)(3)		These three positions are blank (not used).
MAINT ON	Red Lamp	When lit, indicates that some switch on the Maintenance Panel is not properly set for normal operation.
LAMPS CHECK	Pushbutton	Used to check that the Console lamps are functioning. (see page I-12)

SWITCH 1	Bistable Pushbutton	When set, the JS1* instruction executes a program jump. Reset by pressing again.
	White Lamp	When lit, indicates that the switch is set.
SWITCH 2	Bistable Pushbutton	When set, the JS2* instruction executes a program jump. Reset by pressing again.
	White Lamp	When lit, indicates that the switch is set.
STEP BY STEP	Bistable Pushbutton	When set allows execution of a program step-by-step, that is, one instruction is executed each time START is pressed. To return to automatic mode, press STEP BY STEP again, then press START.
	White Lamp	When lit, indicates that the switch is set.
LOAD 1 LOAD 2	Bistable Pushbutton	Selects the input peripheral for starting the system.
	White Lamps	One or the other will be lit, depending on whether LOAD 1 or LOAD 2 is selected.
STAND-BY	Bistable Pushbutton	When set, the START button and the Elapsed Time Counter are disabled. Reset by pressing again.

	Blue Lamp	Indicates the system is in Stand-By condition.
MEM CHECK	Red Lamp	(Memory Check) When lit, indicates an odd-parity error in reading from Core Store. System processing stops.
INV ADDR	Red Lamp	(Invalid Address) When lit, indicates that an invalid address has been used in an instruction. System processing stops.
CLEAR	Pushbutton	By pressing this button, the system is halted and is "cleared" as described in Appendix E, "Details of System Start-Up." To stop processing do not press CLEAR, but STEP BY STEP.
LOAD	Pushbutton	Sets up a hardware bootstrap from the peripheral unit previously selected by the position of LOAD 1/LOAD 2.
HALT START	Pushbutton	Used for starting the system.
	White Lamp	When lit, indicates that the HALT condition is set.
OPERATOR CALL	Blue Lamp	Signals the operator that a condition has occurred which requires his attention. It is lit by a LON* instruction and turned off by a LOFF* instruction or by pressing CLEAR.

b. Program Indicators

ADDR. REG.	16 Lamps	(Address Register) These lamps indicate the address of the next instruction to be executed, expressed in binary. Each set of four lamps represents one hexadecimal digit. (Appendix C)
OF	Lamp	Shows the content of the UF/OF Status Indicator.* When lit, UF/OF is set to one.
NZ	Lamp	Shows the content of the ZE/NZ Status Indicator.* When lit, ZE/NZ is set to one.
IM	Lamp	Shows the content of the Interrupt Mask* in the PSR.* When lit, the IM is set to one.
JE	Lamp	When lit, indicates that the condition tested by a Jump* instruction was present, and therefore a program jump has been executed.
I	Lamp	Indicates that a program interrupt request is present.
C_1 C_2 C_3	3 Lamps	These lights indicate which Channel(s)* are busy.
OP. REG.	8 Lamps	(Operation Register) Shows the operation code in binary of the next instruction to be executed.

2. Peripheral Unit Control Panels

Figures 2 through 7 following illustrate the Control Panels of the peripheral units required for operation of ETOS. Full details on the operation of the units will be found in the subject manuals.

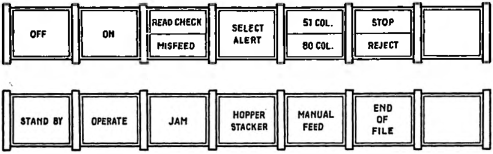

FIGURE 2 - CARD READER (CRZ 111 AND 120) CONTROL PANEL

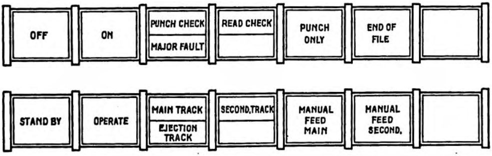

FIGURE 3 - CARD READER/PUNCH (CRP100) CONTROL PANEL

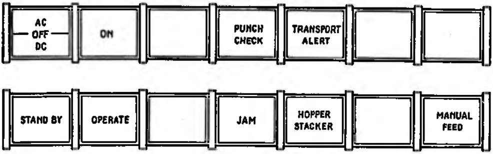

FIGURE 4 - CARD PUNCH (CPZ 101) CONTROL PANEL

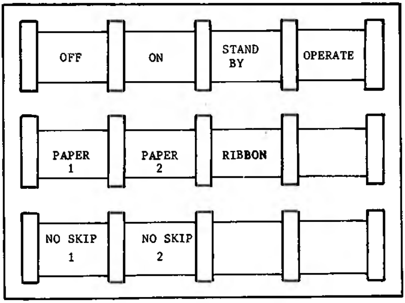

Figure 5 – PRINTER (PRT 102, 103, 112, 113, 119, 132 and 133).

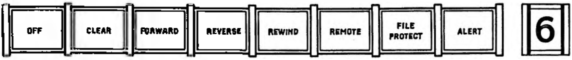

FIGURE 6 - MAGNETIC TAPE UNIT (MTH 103 AND 106) CONTROL PANEL

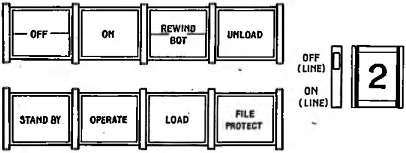

FIGURE 7 - MAGNETIC TAPE UNIT (MTH 101, 163 AND 166) CONTROL PANEL

D. SETTING UP SYSTEM FOR OPERATION

Execute the following series of operations, using the pushbuttons on the Operator's Control Console, and on the Control Panels of the peripheral units (see applicable Subsystem Manuals for details).

1. Power-Up Procedure For the CPU

- a. Check that the main AC switches are ON. They are located in the User's main power distribution panel, which is usually mounted on the wall of the computer room.
- b. Press ~ ON. The POWER OFF light (for DC power) turns on.
- c. After 10 seconds, if system condition is normal (POWER OFF is still on) press POWER ON. The POWER ON light turns on, and the POWER OFF light goes off.
- d. Check that the MAINT ON light is off. If not, remove the upper cover of the Operators Console and check on the Maintenance Panel, that all keys are in the "down" position and that the central rotary switch is in the NORMAL position.
- e. Press LAMPS CHECK to see that the lamps on the Console, except those activated directly by pushbuttons, are operating correctly.

NOTE: This pushbutton must not be used during system operation.

2. Preparing Subsystems For Operation

The peripheral units required for the specific job must be set up for operation, following the procedures given below.

a. Printer

1) Check that the ~ OFF light is on.
2) Press ~ ON. (AC power)
3) Press = ON. (DC power)
4) Check that the Printer is loaded with paper, and that the proper VFU tape loop is installed.
5) Press OPERATE.

b. Card Reader, Card Punch, and Reader/Punch

1) Press ON.
2) In the Reader or Reader/Punch pre-assigned for ETOS start-up, load the Pilot 0 card, followed by the Parameter cards. (see paragraph 3-a, below.)
3) If Punch is to be used, load blank cards into the Input Hopper.
4) Press OPERATE.

c. Tape Units

1) Mount and position the tape(s) on the unit(s) required:
   - If operating in STM, mount the ST on the tape unit specified in the Pilot 0 card. When the MT is required also, mount it according to the specific job.
   - If operating in MTM, mount the MT on the tape unit specified in the Pilot 0 card.
   - Mount the other tapes as required on the units specified for each job.
2) Set the tape unit Select Number(s) as required.
3) Press OPERATE (REMOTE) on each tape unit used.

3. System Start-Up

a. Check that LOAD 1/LOAD 2 is set correctly to select the peripheral unit to be used for system start-up.

NOTE: If this is a Card Reader, select LOAD 1. If it is a Reader/Punch, select either LOAD 1 or LOAD 2, according to the CPU connector to which the unit is attached.

b. Press CLEAR.

c. Press LOAD.

d. Press START. The card deck is read into Core Store and the system starts processing.

For a detailed description of the internal operations commanded by the various control buttons, refer to Appendix E.

E. OPERATOR CONTROL OF PROCESSING

After processing each Order, ETOS automatically reads the next Order card and processes the associated Order program. Thus the entire Parameter card deck in the Card Reader is processed without interruption, unless a special condition occurs that stops processing (see "Messages" below.)

At the end of the Parmeter card deck, the system goes into a "waiting" condition and the Card Reader is set to Standby. When a new Parameter card deck is loaded into the Card Reader and OPERATE is pressed, processing resumes immediately.

During processing the operator checks the indicators on the CPU Console, and the Printer for any messages that may be printed out. Actions are taken as called for by the indicated conditions.

1. Messages

Information on the operation of the system is shown on the Printer by three types of messages:

Logging Messages: Used to signal the operator concerning some condition of the ETOS system, or the progress of its operation.

Operator Intervention Messages: Used to call for operator action in order to continue operations. Processing stops.

Error Condition Messages: Used to notify the operator of errors in I/O media, or in processing. Processing stops.

Every message is preceded by a 4-digit number. The first two digits identify the ETOS program; for example: "10.." identifies the .INT Order program. The second two digits are the message identifier for example: "..16" is the message, "UNIT X: END OF REEL."

A numerical listing of ETOS messages is given in Appendix F. Starting on page II-15 the operator actions pertaining to individual Order programs are described.

NOTE: The messages for the .COB, .FOR, and .SPG Order programs are not included in this list. (See the COBOL,FORTRAN and SPG Manuals.) They are identified by 3-digit numbers.

2. System Halts and Procedures

When the system stops, the HALT light goes on and a message is usually printed out to specify the reason for the halt. The current status of the program is displayed on the CPU Console, as follows:

a. The ADDR. REG. displays the address of the instruction (in binary) where the program has halted. This address also supplies information as to the cause of the halt. Each halt address therefore, corresponds to a distinctive set of actions to be performed by the operator. The HALT Chart, starting on page II-32 lists all possible halt addresses, reasons for the stops, and required operator actions.

b. The OP, REG. contains the operation code of the Halt instruction specified in the ADDR. REG.

When a system halt occurs, the operator proceeds as follows:

a. Read the message printout, if any, and follow the instructions given in Section C, page II-15 for the specific operation involved. If no message is printed out, read the ADDR. REG., converting from binary to hexadecimal (see Appendix C) and follow the instructions given in the HALT Chart (page II-32), for the Halt Address shown in the ADDR. REG.

b. Check the Operator's Console for any lamps that may be lit:
OPERATOR CALL: A condition exists requiring operator action.
MEM CHECK: A parity error has occurred during a data transfer to or from Core Store.
INV ADD: A non-existing address was specified in a program instruction.
For any of these three conditions, follow the instructions given in the Operator Instructions for the specific job.

3. Other Operating Controls

In addition to the actions required by system halts, the operator controls the execution of programs by using the following pushbuttons on the Console:

START: Press this button to resume processing.

STEP BY STEP: Pressing this button stops processing at the end of the current instruction and presets the system for execution of one instruction at a time. Each time START is pressed, one instruction is executed, allowing the operator to check the progress of the program by reading the program indicator lamps. Normal (continuous) processing is restored by releasing STEP BY STEP and pressing START.

NOTE: This button is disabled by the INS instruction (see the GE-130 Reference Manual).

SWITCH 1/SWITCH 2: These buttons are used to select either of two program sequences, as specified by the programmer. SWITCH 2 is used in particular at the end of a program processed in MTM, for selecting the next program to be executed (see page II-32).

STAND BY: Pressing this button inhibits CPU operation and stops the Elapsed Time Counter.

F. SYSTEM SHUT-DOWN

Power is turned off when:

- Operating personnel go off duty.
- An emergency arises.

1. Normal Procedure

a. Turn off power to the peripheral subsystems, as described in the Subsystem Manuals.

b. Turn off power to the CPU by pressing POWER OFF first, then the unlabelled button directly under the ~ ON button.

c. Turn off the main AC switches in the User's main power distribution panel.

In addition to turning off power, the operator is normally responsible for the following:

a. Magnetic Tape Subsystems: Rewind, remove, and store tapes.

b. Card Subsystems: Clear input hoppers and output stackers of all cards.

c. Perforated Tape Subsystems: Rewind, remove and store punched tape.

d. All peripheral subsystems: Close all dust covers and doors.

e. System: Perform housekeeping duties.

2. Emergency Procedures

In emergencies, equipment must first be shut down for protection of both equipment and personnel. The operator should call the Service Engineer immediately.

a. Major Emergencies

Only in major emergencies (fire, for example) is the system protected by turning off power at the main power distribution panel. Where power supply or air blower malfunctions occur, the system shuts itself down automaticly by built-in protective circuits. In case of CPU overheating, the DC ALERT goes on and POWER ON goes off.

b. Minor Incidents

In minor incidents, such as mechanical malfunctions or jammed cards, the operator normally turns off power only to the unit(s) concerned.

II. INDIVIDUAL OPERATING PROCEDURES

A. CONVENTIONS AND NOTES

The operating procedures given in Sections B, C and D, are in chart form in order to consolidate the information for easy and quick reference. The following explanation of column headings is given to simplify the use of the charts.

- ETOS Operations Chart (Section B)

Column Heading	Explanations
OPERATION	Descriptive title of the operations, listed in alphabetic order.
ORDER & DETAIL CARDS	The names of the Parameter cards required by the Order program.
TAPES USED	These are expressed as: ST (System Tape) MT (Master Tape) WT1, WT2, WT3 (Work Tapes 1, 2, or 3) WT (as specified on Parameter card) Other tape (as specified on Parameter card)
ASSIGNED BY	This column gives the name of the Parameter card which identifies the tape unit on which the tape is mounted. The tape unit assignment is made as follows: ST(or MT): The Select Number of this tape unit is always defined by the "Pilot 0" card, in columns 3 and 4.

Therefore, where ST or MT is indicated in the TAPES USED column, the ASSIGNED BY column is left blank.

WT 1.2.3. The Select Numbers of the tape units on which these are mounted are always assigned by the .INT Order card, as follows:

WT1 in column 17
WT2 in column 24
WT3 in column 31 (when used).

Therefore, where WT1, 2, or 3 is indicated in the TAPES USED column, the ASSIGNED BY column is left blank.

WT: The tape unit on which this tape is mounted is defined in the appropriate columns of the Parameter card, as follows:

W1 is WT1,
W2 is WT2,
W3 is WT3,
or Select Number of unit containing the WT.

Other tape: The Select Number of the tape unit is either defined in the appropriate columns of the Parameter Card or is set by the operator.

IN COLS	The columns of the Parameter cards used to specify tape units. This column is blank where Pilot 0 or .INT cards are specified.
INPUT	Tapes, cards or Core Store containing the information to be processed by the Order programs.
OUTPUT	Results of the Order programs.

MESSAGES ORDER NO. PAGE	Refers to the first two digits of the Message identification numbers, and the page number where the message descriptions start.

- Messages and Operator Actions (Section C)

This section contains a sequential list of ETOS message numbers with the corresponding Halt addresses and operator actions. The message printouts are given in Appendix F to clarify the significance of the messages.

The following conventions are used in the Operator Actions and Notes column:

Program Abort: The program has not been executed correctly, or has not processed all Parameter cards for one of the following reasons:

- Tape Error.
- Card wrong, missing, or out of sequence.
- Wrong tape mounted.

- Tape unit out of order.
- Program or S/R not found on tape.
- Core Store overflow.
- File Table missing.
- Miscellaneous.

When a program abort occurs, the operator should notify the programmer. If requested, the system may be restarted by pressing START to process the next Order program.

Impossible to proceed: Processing cannot be restarted. The operator should notify the proper authority.

- Halt Chart (Section D)

Section D contains a sequential listing of all Halt addresses, reason for the halt, and required Operator's action. These halts include those already described in Section C and others that are not associated with any message.

B. ETOS OPERATIONS CHART

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Assembling APS Program (or S/R) from CARDS	.APS None	ST WT1 WT2			Cards containing APS program	WT2 containing object program	24	II-20
Assembling APS Program (or S/R) from TAPE	.APS None	ST WT1 WT2			WT1 containing APS program	WT2 containing object program. WT1 altered during operation	24	II-20
Changing peripheral names in S/R(s)	.SPC SPC(s) END	ST WT1			ST plus SPC(s)	Updated ST	47	II-26
Checking S/R(s) on cards against ST (follows .SBP)	.PSC None	ST WT1			ST and Cards containing S/R(s)	If punch error(s), print-out of message 5507	55	II-29
Checking S/R on cards against WT2 (follows .SBP)	.PSC None	ST WT1 WT2			WT2 and Cards containing S/R	If punch error(s), print-out of message 5507	55	II-29
Closing ST after a Type 3 program	.STC None	ST			ST	Updated ST	42	II-23

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Compiling COBOL Program from CARDS	.COB None	ST WT1 WT2 WT3			Cards containing COBOL program	WT2 containing object program. Printout of: Source program, S/R(s), Object program (if requested), Core Store allocation to program segments, Errors, if any.	See COBOL Manual	
Compiling COBOL Program from TAPE	.COB None	ST WT1 WT2 WT3 Other Tape	.COB	72	Tape containing COBOL program	Same as Compiling from Cards	See COBOL Manual	
Compiling FORTRAN Program from CARDS	.FOR None	ST WT1 WT2 WT3			Cards containing FORTRAN Program	WT2 containing object program. Printout of: Source program, Object program (if requested), Errors, if any.	See FORTRAN Manual	

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Compiling FORTRAN Program from TAPE	.FOR None	ST WT1 WT2 WT3			WT1 containing FORTRAN Program	WT2 containing object program. Printout of: Source program, Object program (if requested), Errors, if any. WT1 altered during operation.	See FORTRAN Manual	
Deleting S/R(s) from ST	.SLS SLS(s) END	ST WT1			ST	Updated ST and printout of new S/R Index	45	II-25
Deleting Type 1 & 3 programs from ST	.STS STS(s) END	ST WT1			ST	Updated ST	44	II-24
Duplicating ST (MT)and/or printing labels	.SPD None	ST(MT) WT (no WT if printout only)	.SPD	6-7	ST (MT)	WT containing duplicated ST (MT) and/or printout of program labels on ST(MT)	41	II-23

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Duplicating Tape	.TDC None	To duplicate ST (MT):ST			Tape to be duplicated	Duplicated/ updated tape	51	II-28
		WT	.TDC	17-18				
		otherwise WT	.TDC	7-8 (input)				
		WT	.TDC	17-18 (output)				
Generating MT	.MTG OPC(s) UPC(s) LBC(s) PRE(s) END	ST			ST and LT plus Detail cards	MT	-9	II-27
		WT for LT	.MTG	5-6				
		WT for MT	.MTG	7-8				
Generating program for Controlled Execution	.DPG *CRT(s) *DTR * TRC(s) END	ST WT1			ST and CRT(s)	Updated ST	30	II-20

* As required

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Generating Sample File on tape	.SGE SBL(s) BLK(s) EBL(s) *TPM(s) END	ST(MT) WT	.SGE	5-6	Detail cards	WT containing Sample File	31	II-21
Generating Sort/ Merge program	.SPG None (followed by .APS)	ST WT1 WT2			Cards containing SPG program	WT1 containing object program in APS	See SPG Manual	
Generating ST	.STG RDC PRC TPC CDC MCC *PNC END	Sample ST WT1 WT2			Sample ST plus Detail cards	WT1 containing ST	40	II-22
Generating ST, using STG Loader	STG Loader (see Note at end of Chart)	Sample ST WT Tape for new ST	#set to 8 #set to 2 #set to 1		Sample ST plus Parameter cards	Tape on Unit 1 containing ST	40	II-22

*as required

#Selected by operator

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Initializing System	.INT None	ST(MT) 2 or 3 tapes			.INT card containing Day's date, User data (optional)and Tape unit assignments	Input data recorded in SRA.	10	II-15
Inserting Assembled S/R in ST (after .APS)	.SLI None	ST WT1 WT2			WT2 and ST	Updated ST	46	II-25
Inserting object program in ST (after .APS)	.API None	ST WT2			WT2 and ST	Updated ST	20	II-17
Inserting punched S/R(s) in ST	.PSI SSB(s) END	ST WT1 WT2			ST and Cards containing S/R(s) (obtained from .SBP)	Updated ST	56	II-30
Listing Parameter cards	.CRD ...(end)	ST(MT)			Parameter card deck (between .CRD and ... card)	Printout of Parameter card deck	33	II-22

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Loading/Starting programs from MT	.PRL * LBC(s) END	MT Tapes required by User programs			MT plus LBC(s) if any	Programs loaded in Core Store and started	22	II-18
Loading/Starting program from ST	.PRL *LBC (s) END	ST Tapes required by User program			ST plus LBC(s) if any	Program loaded in Core Store and started	21	II-17
Loading STG program in ST	(See "Generating ST, using STG Loader")							
Pre-setting system for operation	(See "Initializing System")							
Printing a line of comment	.CMT None	ST(MT)			.CMT card containing comment	Printout of comment	none	
Printing Core Store contents	.MDP None	ST(MT)			Core Store area specified in .MDP card	Printout in hexadecimal and alphameric	34	II-22

*as required

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Printing tape contents	.TDP None	ST(MT) WT (no WT, if printing ST (MT))	.TDP	5-6	Tape to be printed.	Printout in alphameric or hexadecimal	32	II-22
Punching object program from ST	.APP None	ST			ST	Cards containing object program plus PLC and SIN(s) cards. Printout of cards in hexadecimal.	23	II-19
Punching object program from WT2	.APP None	ST WT2			ST and WT2	Cards containing Object program plus PLC and SIN(s) cards. Printout of cards in hexadecimal.	23	II-19
Punching S/R(s) from ST	.SBP None	ST WT1			ST	Cards containing one S/R or entire library. Printout of cards in hexadecimal.	57	II-30

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Punching S/R from WT2	.SBP None	ST WT1 WT2			WT2	Cards containing S/R. Printout of cards in hexa-decimal	57	II-30
Restarting program after Check-Point	.RST None	ST(MT) WT	.RST	9	WT containing Check-Point information	Processing restarts.	61	II-31
Stopping MT operation	.MTS None	MT			none	Processing stops and MT is rewound.	60	II-31
Stopping system operation	.HLT None	ST(MT)			none	Processing stops.	none	
Updating LT	.LTU * PRI(s) * PRT(s) * PRM(s) * LBC(s) END	ST * WT for current LT	.LTU	5-6	ST * LBC(s) * Current LT.	WT containing new or updated LT.	48	II-26
		WT for new LT	.LTU	7-8		Printout of new LT Index.		
Updating ST	.STU * PLC * SIN(s) * SRP(s) END	ST WT1			ST plus Detail cards plus program cards	Updated ST. Listing of program cards.	43	II-24

* as required

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Updating Supervisor	.BPR BRP(s) END	ST WT	.BPR	5-6	ST plus program cards after each BRP card.	WT containing new ST	50	II-28
Writing Tape Labels	.TLW TLW(s) END	ST(MT) *tapes	TLW(s)	6-7	TLW(s)	labelled tapes	11	II-16
Checking program on cards against ST (follows .APP)	.PCC None	ST			ST and cards containing program	If punch error(s), print-out of message 5851	58	31.0
Checking program on cards against WT2 (follows .APP)	.PCC None	ST WT2			WT2 and cards containing program	If punch error(s), print-out of message 5851	58	31.0

*as required

OPERATION	ORDER & DETAIL CARDS	TAPES USED	ASSIGNED BY	IN COLS	INPUT	OUTPUT	MESSAGES	
							ORDER NO.	PAGE
Duplicating card deck	.CDC ...(end)	ST(MT)			Card deck to be duplicated (between .CRD and ...card)	Duplicated card deck and listing if requested	52	29.0
Duplicating LT and/or printing labels	.LPD None	ST(MT) WT1 WT2 (none, if print-out only)			WT1	WT2 if duplicating. Printout of WT1 if requested	53	29.0
Merging two LT's	.LTM *LPI(s) END	ST(MT) WT1 WT2			WT1	WT2	54	29.1

NOTE: Generating ST using STG Loader: Parameter cards should be loaded in the following sequence:

Program Loader
STG Loader
STG Loader Parameter card
STG Loader END card
.STG Detail cards
.STG END card

Pilot 0 card is not used.

* as required

C. MESSAGES AND OPERATOR ACTIONS

Message Number	HALT Address	Operator Actions and Notes
01..		PILOT 1 (in Supervisor)
0196	None	None. (Another Order is read.)
02..		PILOT 2 (in Supervisor)
0201	02A6	Program abort. Tape read error. ST(MT) is rewound.
0202 0297	02A6	Program abort.
10..		.INT
1001	0000	Impossible to proceed. Tape read error. Message 1055 follows.
1002	01DA 02A6 None	Press OPERATE (REMOTE) on tape unit and START on CPU console. Program abort. Message 1055 follows. None. Program ends normally.
1010	0000	Impossible to proceed. Message 1057 follows.
1029 1031 1050 1051 1052	0000	Impossible to proceed. Message 1098 follows.
1053	01DC	Correct the tape unit(s) Select Number(s), press OPERATE (REMOTE) on tape unit and START on CPU console.
1054	0000	Impossible to proceed.

Message Number	HALT Address	Operator Actions and Notes
1055		Follows messages 1001 or 1002 (when HALT address is 02A6).
1056		Follows message 1010.
1057		Follows messages 1001 and/or 1002, and 1010.
1072 1073 1074 1075	None	None. These messages show the Select Numbers of the tape units containing the ST (MT) and the WT's.
1076	None	None. This message states that no tape unit was assigned to WT3.
1098		Follows messages 1029, 1031, 1050, 1051, or 1052. Reload Pilot 0 card and .INT card (corrected as required), press CLEAR, LOAD and START.
1099	None	.INT program has been executed correctly.
11..		.TLW
1101	02A6	Program abort. Tape write error.
1102	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
1106 1123 1126 1127 1129 1130 1135	02A6 *	Program abort. *The program proceeds to its end, processing all correct Detail cards befor stopping at address 02A6.
1199	None	.TLW program has been executed correctly.

Message Number	HALT Address	Operator Actions and Notes
20..		.API
2001	02A6	Program abort. Tape read or write error.
2002	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
2008	02A6	Program abort.
2013	02A6*	Program abort. *The program is executed before stopping at address 02A6.
2021	02A6	Program abort.
2038		
2071	None	None. Program label recorded on WT2 is printed.
2099	None	.API program has been executed correctly.
21..		.PRL (from ST)
2101	02A6	Program abort. Tape read error.
2102	02A6	Program abort.
	None	None. Program ends normally.
2106	02A6	Program abort.
2108		
2120		
2124		
2125		
2127		
2128		
2129		
2131		
2132		
2133		
2134		
2136		

Message Number	HALT Address	Operator Actions and Notes
2137	02A6	Program abort. Message 2106 follows.
2150	02A6	Program abort.
2151	None	None. The User program is loaded and executed anyway.
2199	None	. PRL program has been executed correctly.
22..		. PRL (from MT)
2201	02A6	Program abort. Tape read error.
2202	02A6 01D6	Program abort. Message 2284 follows.
2206	02A6	Program abort. The MT is rewound.
2208		
2220		
2224		
2225		
2227		
2228		
2229		
2231		
2232		
2233		
2234		
2237	02A6	Program abort. Message 2206 follows.
2280	None	None. Indicates the beginning of User's program with day's date.
2281	None	None. Indicates the name of the next program.
2282	01D8	Sequence of operations: 1. Turn SWITCH 2 to OFF to select program XXXXXXXX; to ON to select program YYYYYYYY.

Message Number	HALT Address	Operator Actions and Notes
		2. Press START. 3. Turn SWITCH 2 to OFF. 4. Press START.
2283	None	None. States that the next program will be selected by a .PRL card.
2284	01D6	Indicates end of MT operation. MT is rewound. If requested, press START to call Pilot 0.
2285	None	None. Indicates the name of the next program.
2299	None	None. Specifies name of program just completed.
23..		.APP
2301	02A6	Program abort. Tape read error.
2302	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
2307	02A6	Program abort. Signals that some cards (designated by two asterisks in the card listing) have been punched incorrectly.
2308	02A6	Program abort.
2315	02A6	Program abort. Connect Card Punch or Reader/Punch, as required.
2321 2323 2338 2346 2350	02A6	Program abort.
2371	None	None. Program label recorded on WT2 is printed out.
2399	None	.APP program has been executed correctly.

Message Number	HALT Address	Operator Actions and Notes
24..		.APS
2401	02A6	Program abort. Tape read or write error.
2402	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
2450 2451 2452	02A6	Program abort.
2453 2454	02A6*	Program abort. * User program or subroutine (whichever is applicable) has been translated but contains errors.
2498	None	Translation of subroutine has been executed correctly.
2499	None	Translation of User program has been executed correctly.
30..		.DPG
3001	02A6	Program abort. Tape read or write error.
3002	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
3006 3008 3041 3042 3043 3044	02A6	Program abort.

Message Number	HALT Address	Operator Actions and Notes
3050 3051 3052 3053 3054	02A6	Program abort.
3099	None	.DPG program has been executed correctly.
31..		.SGE
3101	02A6	Program abort. Tape read or write error.
3102	01DA 02A6 None	Press OPERATE (REMOTE) on tape unit and START on CPU Console. Program abort. None. Program ends normally.
3106	02A6	Program abort.
3112	None 02A6 *	None. Col. 5 of END card is blank. Program abort. Col. 5 of END card is not blank. * The program proceeds to its end before stopping at address 02A6.
3116	02A6	Program abort. Output tape is rewound.
3123 3126 3127 3130 3144 3145 3147 3150	02A6	Program abort.
3199	None	.SGE program has been executed correctly.

Message Number	HALT Address	Operator Actions and Notes
32..		.TDP
3201	None	None. The input tape is rewound and Pilot 0 is restarted.
3202	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU Console.
	02A6	Program abort.
	None	None. Program ends normally.
3223 3226 3227 3247 3250	02A6	Program abort.
3277	None	None. The message is the heading of the tape printout.
3299	None	.TDP program has been executed correctly.
33..		.CRD
3302	None	None. Program ends normally.
3399	None	End of .CRD program.
34..		.MDP
3495	None	None. Shows name of program to be printed out.
3499	None	End of .MDP program.
40..		.STG
4001	02A6	Program abort. Tape read or write error.
4002	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.

Message Number	HALT Address	Operator Actions and Notes
4010 4020 4027 4040 4050 4051 4052 4053	02A6	Program abort.
4099	None	.STG program has been executed correctly.
41..		.SPD
4101	02A6	Program abort. Tape read or write error.
4102	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
4118 4123 4151	02A6	Program abort.
4199	None	.SPD program has been executed correctly.
42..		.STC
4201	02A6	Program abort. Tape write error.
4202	02A6	Program abort.
	None	None. Program ends normally.
4208 4221	02A6	Program abort.
4299	None	.STC program has been executed correctly.

Message Number	HALT Address	Operator Actions and Notes
43..		.STU
4301		Program abort. Tape read or write error.
4302	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
4306 4308 4311	02A6	Program abort.
4313	02A6 *	Program abort. *The program is executed anyway, then stops at address 02A6.
4320 4321 4329 4341 4342 4343 4346	02A6	Program abort.
4399	None	.STU program has been executed correctly.
44..		.STS
4401	02A6	Program abort. Tape read or write error.
4402	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU Console.
	02A6	Program abort.
	None	None. Program ends normally.
4406	02A6	Program abort.
4408 4420 4421	02A6*	Program abort. *Incorrect card(s) not processed but program is completed before stopping at address 02A6.
4499	None	.STS program has been executed correctly.

Message Number	HALT Address	Operator Actions and Notes
45..		.SLS
4501	02A6	Program abort. Tape read or write error.
4502	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
4506	02A6	Program abort.
4509	02A6*	Program abort. *Incorrect card(s) not processed but program is completed before stopping at address 02A6.
4518	02A6	Program abort.
4539	02A6*	Program abort. *Incorrect card(s) not processed but program is completed before stopping at address 02A6.
4578	None	None. New Subroutine Library Index follows.
4599	None	.SLS program has been executed correctly.
46..		.SLI
4601	02A6	Program abort. Tape read or write error.
4602	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
4609	02A6	Program abort.
4614		
4638		
4639		
4650		
4651	02A6	Program abort. Followed by listing of incorrect instructions.
4699	None	.SLI program has been executed correctly.

Message Number	HALT Address	Operator Actions and Notes
47..		.SPC
4701	02A6	Program abort. Tape read or write error.
4702	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
4706	02A6	Program abort.
4709 4739 4740 4750	02A6*	Program abort. *Incorrect card(s) not processed but program is completed before stopping at address 02A6.
4799	None	.SPC program has been executed correctly.
48..		.LTU
4801	02A6	Program abort. Tape read or write error.
4802	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
4806	02A6	Program abort.
4808	02A6*	Program abort. *Program is completed before stopping at address 02A6.
4810 4812	02A6	Program abort.
4819	02A6*	Program abort. * The program processes only those cards that have been accepted in Core Store, proceeding to its end before stopping at address 02A6.

Message Number	HALT Address	Operator Actions and Notes
4820	02A6	Program abort.
4823		
4824		
4825		
4827		
4828		
4829		
4834		
4838	02A6*	Program abort. * The program is completed before stopping at address 02A6.
4879	None	None. New Library Tape Index follows.
4899	None	.LTU program has been executed correctly.
49..		.MTG
4901	02A6	Program abort. Tape read or write error.
4902	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
4906	02A6	Program abort. May be followed by message 4937
4908	02A6	Program abort.
4910		
4920		
4923		
4924		
4925		
4926		
4928		
4929		

Message Number	HALT Address	Operator Actions and Notes
4931 4932 4933 4934	02A6	Program abort.
4937		Preceded by message 4906.
4950	02A6	Program abort.
4951	02A6	Program abort. When this condition is detected the MT is closed.
4999	None	.MTG program has been executed correctly.
50..		.BPR
5001	02A6	Program abort. Tape read or write error.
5002	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5006 5010 5011 5023 5027 5041 5044 5047 5050	02A6	Program abort.
5099	None	.BPR program has been executed correctly.
51..		.TDC
5101	02A6	Program abort. Tape read or write error.
5102	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.

Message Number	HALT Address	Operator Actions and Notes
5110	02A6	Program abort.
5116	None	None. Program ends normally.
	02A6	Program abort. Duplication is incomplete.
5117 5150 5151 5152 5153 5154 5155 5156 5157 5158 5159 5160	02A6	Program abort.
5199	None	.TDC program has been executed correctly.

(continued)

Message Number	HALT Address	Operator Actions and Notes
52..		.CDC
5202	None	None. Program ends normally.
5207	02A6	Program abort. Signals that some cards (designated by two asterisks) have been punched incorrectly.
5215 5218	02A6	Program abort.
5299	None	.CDC program has been executed correctly.
53..		.LPD
5301	02A6	Program abort. Tape read or write error.
5302	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5318 5350	02A6	Program abort.
5399	None	.LPD program has been executed correctly.
		(continued)

Message Number	HALT Address	Operator Actions and Notes
54..		.LTM
5401	02A6	Program abort. Tape read or write error.
5402	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5406	02A6	Program abort.
5408 5413	02A6*	Program abort. *The program is completed before stopping at address 02A6.
5418	02A6	Program abort.
5419	02A6*	Program abort. *The program processes only the cards that have been accepted, than stops at 02A6.
5499	None	.LTM program has been executed correctly.
55..		.PSC
5501	02A6	Program abort. Tape read error.
5502	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5507	02A6	Program abort. Followed by listing of incorrect card(s), identified by two asterisks, and by hexadecimal printout of input information in Core Store.
5509 5523 5538 5539 5550	02A6	Program abort.

Message Number	HALT Address	Operator Actions and Notes
5551	02A6	Program abort. Incorrect instructions are printed out.
5599	None	. PSC program has been executed correctly.
56..		. PSI
5601	02A6	Program abort. Tape read or write error.
5602	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5606	02A6	Program abort.
5609 5611 5614 5629 5639 5641 5644	02A6 *	Program abort. *Incorrect card(s) not processed but program is completed before stopping at address 02A6.
5699		. PSI program has been executed correctly.
57..		.SBP
5701	02A6	Program abort. Tape read error.
5702	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5707	02A6	Program abort. Signals that card(s) (identified by two asterisks in the card listing) have been punched incorrectly.
5709	02A6	Program abort.

Message Number	HALT Address	Operator Actions and Notes
5715	02A6	Program abort. Connect Card Punch or Reader/Punch, as required.
5723 5738 5739 5750	02A6	Program abort.
5751	02A6	Program abort. Incorrect instructions are printed out.
5799	None	.SBP program has been executed correctly.
		(continued)

Message Number	HALT Address	Operator Actions and Notes
58..		.PCC
5801	02A6	Program abort. Tape read or write error.
5802	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
5808 5821 5823 5846 5850	02A6	Program abort.
5851	02A6	Program abort. Signals that some cards (designated by two asterisks) have been punched incorrectly.
5899	None	.PCC program has been executed correctly.
60..		.MTS
6002	01D6	Followed by message 6084.
6084	01D6	Signals the end of Master Tape operation. If requested, press START, or if message 6002 was printed before, press OPERATE (REMOTE) on tape unit and START on CPU console.

Message Number	HALT Address	Operator Actions and Notes
61..		.RST
6101	02A6	Program abort. Tape read error.
6102	01DA	Press OPERATE (REMOTE) on tape unit and START on CPU console.
	02A6	Program abort.
	None	None. Program ends normally.
6108 6110 6117 6123 6126 6127 6150 6151 6152	02A6	Program abort.
6199	None	.RST program has been executed correctly.

D. HALT CHART

HALT ADDR.	REASON FOR HALT	OPERATOR'S ACTION
0000	Specified by message during execution of .INT.	Impossible to proceed. After the error condition has been corrected, restart processing by reloading Pilot 0 and .INT cards and pressing CLEAR, LOAD and START.
00FA	(During execution of object program.) Signals that a Check-Point was recorded on tape.	Press START to resume processing.
01C8	Persistent tape read/write error.	Press START to make five more read/write attempts.
01CA	Persistent tape read error during execution of Pilot 1.	Press START to make five more read attempts.
01D0	Tape unit out of order (during Pilot 1 operation).	Impossible to proceed.
01D4	Block number wrong.	Press START to search for correct block.
01D6	End of program.	Press START to read and process another Order card.
01D8	Allows operator to select next program as indicated by message: "NEXT PROGRAM IS X WITH SWITCH 2 OFF/Y WITH SWITCH 2 ON.	Sequence of operations: 1. Turn SWITCH 2 OFF to select program X, to ON to select program Y. 2. Press START. 3. Turn SWITCH2 to OFF 4. Press START.

HALT ADDR.	REASON FOR HALT	OPERATOR'S ACTION
01DA	1) Tape unit out of order after rewind command.	Press OPERATE (REMOTE) on tape unit and START on CPU console to attempt rewind operation again. If unit is still out of order, processing stops at address 02A6: Program abort.
	2) Tape unit out of order or not selected (during .INT program.)	Press OPERATE (REMOTE) and select tape unit correctly, then press START. If unit is still out of order or not selected, processing stops at address 0000 (see above).
01EC	(During execution of object program.) Tape unit out of order or tape read/write error.	Press START to resume processing.
01EE	(During execution of object program.) One of the following File Opening errors: . First Tape Header Label not INT1 or VOL1. . Second Tape Header Label not HDR1. . No TM after HDR1.	Mount the correct tape and press OPERATE (REMOTE) on tape unit and START on CPU console.

HALT ADDR.	REASON FOR HALT	OPERATOR'S ACTION
01F0	(During execution of object program.) HDR1 contents do not match File Table contents.	Mount the correct tape and press OPERATE (REMOTE) on tape unit and START on CPU console or, to continue: 1. Set SWITCH 2. 2. Press START. Processing stops again. 3. Reset SWITCH 2. 4. Press START.
01F2	(During execution of object program.) One of the following macro-instructions (shown in quotes) has been used illegally: "OPEN" used on File already open. "NEXT" used on File still open. "CLOSE" used on File already closed. "CHKP" used on File not opened before.	Notify the programmer. If requested, press START to resume processing from the instruction following the illegal macro-instruction (which has no effect).
01F4	(During execution of object program.) Block count check on standard input File has failed.	To resume processing, execute the following operations in sequence: Set SWITCH 2. Press START. Processing stops again. Reset SWITCH 2. Press START.

HALT ADDR.	REASON FOR HALT	OPERATOR'S ACTION
01F6	(During execution of object program.) Reel to be changed on tape unit.	If single-unit file, mount new reel, then press OPERATE (REMOTE) on tape unit, and START on CPU console. If alternate-unit file, press START on CPU console to resume processing, then mount new reel on the unit that is out of tape and press OPERATE (REMOTE) on unit control panel. Note: The User has the option to notify the operator about the unit requiring reel change either by a printed message or by lighting the OPERATOR CALL indicator.
0206	Invalid card detected during execution of STG Loader.	Notify the programmer.
020C	.STG Program not found on Sample ST.	Notify the programmer.
0210	End of STG Loader.	Proceed with work schedule.
02A6	Reason for stop specified in message.	Program abort. If requested press START to read and process another Order card.
02C0	Program segment not found by Segment Load Routine.	Program abort. If requested press START to read and process another Order card.

HALT ADDR.	REASON FOR HALT	OPERATOR'S ACTION
02CA	Persistent tape read error during execution of Segment Load Routine.	Program abort. If requested press START to read and process another Order card.
0EF0	Error(s) detected in COBOL source program.	According to the instructions given: 1) Either disregard the error(s) and continue processing as follows: With SWITCH 1 ON, press START. Processing stops again. Reset SWITCH 2.. Press START. 2) Or, with SWITCH 2 OFF, press START to call Pilot 0 and read and process another Order card.

III. APPENDIXES

A. GLOSSARY OF TERMS

TERMS	DEFINITIONS
Address	A number or other reference that designates a specific location in storage.
APS	"Assembly Programming System." The symbolic, machine-oriented language used for developing programs for the GE-100 Series of systems.
Binary	Pertaining to a number system based on the use of two digits (0 and 1), as compared to the decimal system, which uses ten digits.
Bit	A contraction of "binary digit". A single character in a binary number.
Block	On magnetic tape, a series of characters that are read or recorded during a single data transfer operation.
Check-Point	The point where a program is restarted, using the .RST Order card. Indicated by a decimal number punched in columns 5 to 8.
COBOL	"Common Business Oriented Language." A symbolic language used for developing programs for accounting and administrative applications on the GE-100 Series of systems.

TERMS	DEFINITIONS
Connector	The CPU has four points (connectors) to which the peripheral units are physically tied. The connectors are switched between I/O Channels, under program control.
Controlled Execution	Execution of a program prepared by the .DPG Order, by inserting corrections and providing for the printout of significant Core Store areas.
Core Store	CPU Store, made up of an array of magnetic cores used for storing information.
CPU	"Central Processing Unit." The unit of the computer whose main function is to interpret the program instructions and carry out arithmetic and logic operations.
Density	See "Recording Density."
File	A collection of data, complete in some sense, for the purpose of a particular job. For example, in Inventory Control, a file may consist of all stock purchase invoices for a given period. A second file may consist of all items issued from inventory during the same period.
File Retention Period	The length of time during which the file must not be modified. Expressed in number of days.
File Table	A block of data on tape containing the specifications pertaining to the data files of a program. It is recorded, when required, before its associated program.

TERMS	DEFINITIONS
FORTRAN	"FORmula TRANslator." A symbolic language used for developing programs for mathematical, technical and scientific applications on the GE-100 Series of systems.
Header Labels, Standard	Two blocks of data indicating the beginning of a standard data tape and a Program Tape (ST, MT, LT). The first is VOL1 (for a 9-track tape) or INT1 (for a7-track tape). The second label is HDR1.
HDR1	See "Header Labels, Standard."
Input/Output (I/O)	Pertaining to the transfer of information between the CPU and the peripheral units.
Instructions	A list of commands in a program to be executed.
Machine Language	Pertaining to the instructions in Core Store ready for processing. Derived from the symbolic languages through program translation.
Memory Trace Routine	A part of the .DPG Order program. When requested, it causes the printout of specified Core Store areas at specified addresses (Trace Points, or TRC Points) in a program. This routine uses, in addition, a Trace Point Table (TRC Table).
Object Program	A program after it has been translated from a source (symbolic) language.
Octet	The basic unit of information used in the GE-100 Series of systems. It consists of eight binary digits.

TERMS	DEFINITIONS
Operation Code	That part of a machine-language instruction which specifies the operation to be executed.
Parity Check Bit	Used for checking the validity of each octet read from storage. This is done automatically by counting the total number of "1" bits in the octet, including the parity bit. The result must be either an even or an odd quantity, depending on whether even or odd parity is being used.
Path Trace Routine	A part of the .PRL Order program; This routine can be requested in the .PRL card for printing out all jump instructions that have occurred during the execution of the User program.
Program Label	A data field used to identify a program and preceding it on a Program Tape (ST, LT, or MT).
Pilot 1	A part of the Supervisor. Its main function is to read and check the Order cards. Pilot 1 starts Pilot 2.
Pilot 2	A part of the Supervisor. Its main function is to search the ST or MT for the Order program to be executed, and to start the Segment Load Routine.
Program Card	A card containing program instructions.
Program Translation	Conversion from source to object program. It is executed, for example, by the APS Assembler and by the COBOL and FORTRAN Compilers.
Recording Density	On magnetic tape, the number of 6- or 8-bit characters that are recorded in one inch.

TERMS	DEFINITIONS
Retention Period	See "File Retention Period."
Segment	A program subdivision which can be processed in the system without holding the entire program in Core Store at any one time.
Segment Load Routine	A part of the Supervisor. It loads a program segment from the ST or MT, and starts it.
Select Number	See "Tape Unit Select Number."
Source Language	A symbolic language (for example, APS, COBOL, FORTRAN) used for writing source programs.
Source Program	A computer program written in a symbolic language designed to be translated into machine language by an Assembler or Compiler.
SPG	"Sort/Merge Program Generator." A symbolic language used for developing Sort/Merge programs for the GE-100 Series of systems.
Standard File (Tape)	A file on tape containing standard Header and Trailer Labels, and Tape Marks (TM's).
Subsystem	A peripheral unit or units plus Controller, used by the CPU for input and/or output of data to (or from) Core Store.
Tape Mark (TM)	A special one-character block on tape, used at both ends of a library of programs on ST, MT, and LT, and as a program separator on ST and MT.
Tape Serial Number	The alphameric tape identifier recorded in VOL1 or INT1 Header Labels.

TERMS	DEFINITIONS
Tape Unit Select Number	The number assigned by the Operator to a tape unit. It is shown on the right side of the Control Panel in figures 6 and 7, page I-11.
Trace Routine	See "Memory Trace Routine" and "Path Trace Routine".
Trailer Label, Standard	A block of data indicating the end of a standard data tape or a Program Tape (ST, MT, or LT). In a data file it is designated EOV1 (End of Volume) or EOF1 (End of File).
TRC Point	See "Memory Trace Routine."
TRC Table	See "Memory Trace Routine."
Volume	Synonymous with "tape" or "reel".

B. PREREQUISITE AND RELATED READING

Codes	TITLE	Catalog Number
P-O	Relevant Subsystem Manuals	See NOTE
R-O	GE-130 Reference Manual	CPB-1896
R-O	GE-130 ETOS Programmers Reference Manual	To be assigned
P-O	GE-130 APS Programmer's and Operator's Reference Manual	To be assigned
R-O	GE-130 COBOL Reference Manual	To be assigned
R-O	GE-130 FORTRAN Manual	To be assigned
R-O	GE-130 SPG Manual	To be assigned

Codes:
P = Prerequisite Reading
R = Related Reading
O = Operators

NOTE: The Operator should be familiar with Subsystem Manuals pertaining to the system configuration installed.

C. HEXADECIMAL READ-OUT OF PROGRAM INDICATORS

BINARY	HEXADECIMAL	DECIMAL
8 4 2 1		
o o o o	0	0
o o o ●	1	1
o o ● o	2	2
o o ● ●	3	3
o ● o o	4	4
o ● o ●	5	5
o ● ● o	6	6
o ● ● ●	7	7
● o o o	8	8
● o o ●	9	9
● o ● o	A	10
● o ● ●	B	11
● ● o o	C	12
● ● o ●	D	13
● ● ● o	E	14
● ● ● ●	F	15

o = Lamp not lit
● = Lamp lit

Example: HALT at hexadecimal address 02A6. Lamps in Address Register are lit as follows:

	8 4 2 1	8 4 2 1	8 4 2 1	8 4 2 1
(binary)	o o o o	o o ● o	● o ● o	o ● ● o
(hexa)	0	2	A	6

D. PILOT 0 CARD FORMAT

The Pilot 0 card is punched in Hollerith and Bull codes as follows:

Columns	Contents	
	Hollerith Code	Bull Code
1 - 2	9>	ZU
3 - 4	00 if ST(MT) on unit 8	b̸b̸ if ST(MT) on unit 8
	01 " " 1	b̸6 " " 1
	02 " " 2	b̸5 " " 2
	03 " " 3	b̸4 " " 3
	04 " " 4	b̸3 " " 4
	05 " " 5	b̸2 " " 5
	06 " " 6	b̸1 " " 6
	07 " " 7	b̸0 " " 7
5 - 10	00229>	b̸b̸55ZU
11 - 12	Same as columns 3 - 4	Same as columns 3 - 4
13 - 18	00249>	b̸b̸53ZU
19 - 20	Same as columns 3 - 4	Same as column 3 - 4
21 - 25	00189	b̸b̸69Z
26 - 30	50300	2b̸4b̸b̸
31 - 35	?>43>	TU34U
36 - 40	00004	b̸b̸b̸b̸3
41 - 42	9>	ZU
43 - 44	Same as columns 3 - 4	Same as columns 3 - 4
45	0	b̸
		(t. o.)

Columns	Contents	
	Hollerith Code	Bull Code
46 - 50	02602	b̸51b̸5
51 - 55	40432	3b̸345
56 - 60	0026@	b̸b̸51W
61 - 65	43?00	34Tb̸b̸
66 - 70	00080	b̸b̸b̸9b̸
71 - 75	44804	339b̸3
76 - 80	7@04[	0Wb̸3Y

See Appendix G, "GE-100 Series Character Set," for the representation of graphic characters on cards and in the CPU.

E. DETAILS OF SYSTEM START-UP

This is a detailed description of system start-up, as obtained by the appropriate setting of :

LOAD 1/LOAD 2, and by pressing in sequence
CLEAR
LOAD
START

Some terms used here (identified by an asterisk) are used only in programming. If definitions are desired, they will be found in the GE-130 Reference Manual.

1. The LOAD 1/LOAD 2 button is used to select either of two peripheral units for system start-up. These units are defined at installation time by enabling two I/O connectors in the CPU, as follows:

Alternatives	I/O Connectors	
	LOAD 1	LOAD 2
Case 1	2	3
Case 2	4	3
Case 3	2	4

2. The pressing of CLEAR has the following effects:

The Address Register in the PSR* Register is reset to zero.
The Interrupt Mask* in PSR is set to one.
Any error indications are reset.
The STEP BY STEP button is re-enabled.
The OPERATOR CALL light goes off.

3. The pressing of the LOAD button sets up a hardware bootstrap, starting from the unit previously selected by the setting of the LOAD 1/LOAD 2 button.

4. When START is pressed, the Pilot 0 program is loaded in Core Store, at hexadecimal Address 0000 and started.

   The Pilot 0 program has to be loaded into Core Store only when the system is first started, and it normally remains there, unaltered, during processing.

F. NUMERICAL LISTING OF ETOS MESSAGES

Each message printed out is preceded by a 4-digit number. The second two digits (listed here in ascending order) identify the message. The first two digits identify the Order program.

NOTES:

1. Order program identifiers are omitted except when a given message identifier refers to more than one message printout.

2. Some numbers with the same last two digits are used to identify different messages. For these messages, the complete 4-digit number is given.

Message Number	Message Title
..01	*UNIT X: PERSISTENT ERROR
..02	*UNIT X: OUT OF ORDER
..06	*INVALID DETAIL CARD
..07	*PUNCH ERROR ON** CARD
..08	*PROGRAM TXXXXXXXX NOT FOUND (see Note)
2008 2208	*PROGRAM XXXXXXXX NOT FOUND
..09	*SUBROUTINE YNNNNN NOT FOUND
..10	*UNIT X: SERIAL NUMBER XXXXXX WRONG/SHOULD BE NNNNNN
..11	* CARD COUNT WRONG
..12	* UNIT X: HDR1 LABEL NOT FOUND
..13	* MULTIPLE PROGRAM NAME TXXXXXXXX (see Note)
..14	* MULTIPLE SUBROUTINE NAME YNNNNN
..15	* PUNCH NOT CONNECTED
..16	* UNIT X: END OF REEL

NOTE: "T" indicates program type.

Message Number	Message Title
..17	*UNIT X: NON-STANDARD FILE
..18	*EXECUTION TYPE CODE WRONG
..19	*DETAIL CARD OVERFLOW/ YYYXXXXXXXX LAST CARD
..20	*INVALID PROGRAM NAME
4020	*INVALID DETAIL CARD
..21	*ILLEGAL PROGRAM TYPE
..23	*TAPE UNIT CODE WRONG
..24	*MAIN UNIT CODE WRONG
..25	*ALTERNATE UNIT CODE WRONG
..26	*ILLEGAL PARITY CHECK CODE
4926	*ILLEGAL DENSITY CODE
..27	*ILLEGAL DENSITY CODE
..28	*FILE IDENTIFICATION CODE XXXXXX NOT FOUND
..29	*INVALID DATE
..30	*ILLEGAL TRAILER LABEL CODE
..31	*USER DATA CODE WRONG
..32	*MEMORY LOADING CODE WRONG
..33	*HALT CODE WRONG
..34	*INVALID FILE CHECK OPTION CODE
..35	*INVALID TRACKS NUMBER
..36	*FILE TABLE OVERFLOW
..37	*FILE TABLE NOT FOUND
..38	*INVALID LABEL
4838	*FILE TABLE NOT FOUND
..39	*INVALID SUBROUTINE NAME
..40	*INVALID PERIPHERAL NAME XXX
..41	*DATA CARD WRONG
..42	*SEGMENT NUMBER XX WRONG

Message Number	Message Title
..43	* SEGMENT NUMBER XX NOT FOUND
..44	* DATA LENGTH WRONG
5044	* BLOCK LENGTH WRONG
..45	* BLOCK LENGTH WRONG
..46	* ILLEGAL PLC TYPE CODE
..47	* BLOCK NUMBER WRONG
1050	* UNIT NUMBER OF WORK TAPE (1, 2, or3) WRONG
2150	* TRACE ROUTINE CODE WRONG
2350 5850	* ILLEGAL CARD COUNT CODE
2450	* TRANSLATION TYPE WRONG
3050	* INVALID ADDRESS
3150	* DATA RECORDING MODE WRONG
3250	* PRINTOUT MODE WRONG
4050	* DETAIL CARD MISSING
4650 5550 5750	* SUBROUTINE ADDRESS WRONG
4750	* SUBROUTINE YXXXXX PERIPHERAL XXX NOT FOUND
4950	* MONITOR ROUTING CODE WRONG
5050	* INVALID DATA CARD ADDRESS
5150	* FILE TYPE CODE WRONG
5350	* LIBRARY TAPE CODE WRONG
6150	* UNIT X: CHKP NNNN NOT FOUND
1051	* SYSTEM (MASTER) TAPE AND WORK TAPE (1, 2, or3) WITH SAME UNIT NUMBER
2151	* EXECUTION WITH TRACE ROUTINE IMPOSSIBLE
2451	* SUBROUTINE TYPE WRONG
3051	* GENERATED PROGRAM OVERFLOW
4051	* INVALID CORE STORE CAPACITY CODE
4151	* USER PROGRAM CODE WRONG

Message Number	Message Title
4651 5551 5751	* SOURCE STATEMENT WRONG
4951	* MONITOR PROGRAM TABLE OVERFLOW
5151	* INPUT TAPE UNIT CODE WRONG
5851	* ERROR ON ** CARD
6151	* CHKP - BLOCK INCORRECT
1052	* WORK TAPE X AND WORK TAPE Y WITH SAME UNIT NUMBER
2452	* INVALID STRT CARD
3052	* TRC TABLE OVERFLOW
4052	* INVALID PERIPHERAL CODE
5152	* ILLEGAL INPUT PARITY CHECK CODE
6152	* UNIT X: POSITIONING ERROR
1053	* UNITS OUT OF ORDER OR NOT SELECTED/START
2453	* INVALID APS TRANSLATION
3053	* TRC POINT XXXX WRONG
4053	* CONFIGURATION NOT ACCEPTED
5153	* ILLEGAL INPUT DENSITY CODE
1054	* UNITS OUT OF ORDER OR NOT SELECTED/IMPOSSIBLE TO PROCEED
2454	* INVALID SUBROUTINE TRANSLATION
3054	* PROGRAM DELETION CODE WRONG
5154	* OUTPUT TAPE UNIT CODE WRONG
1055	* TAPE ERROR/IMPOSSIBLE TO PROCEED
5155	* ILLEGAL OUTPUT PARITY CHECK CODE
1056	* SERIAL NUMBER WRONG/IMPOSSIBLE TO PROCEED
5156	* ILLEGAL OUTPUT DENSITY CODE
1057	* TAPE ERROR AND SERIAL NUMBER WRONG/IMPOSSIBLE TO PROCEED
5157	* INVALID FILE APPENDING CODE
..58	* INVALID RETENTION PERIOD

Message Number	Message Title
..59	*INVALID NUMBER OF BLOCKS ON INPUT TAPE
..60	*INVALID NUMBER OF BLOCKS ON OUTPUT TAPE
..71	*PROGRAM LABEL .....
..72	*SYSTEM (MASTER) TAPE: UNIT X
..73	*WORK TAPE 1: UNIT X
..74	*WORK TAPE 2: UNIT X
..75	*WORK TAPE 3: UNIT X
..76	*WORK TAPE 3 NOT INDICATED
..77	* TAPE DUMP OF UNIT X FROM BLOCK YYYYY/BLOCKS ZZZZZ
..78	* SUBROUTINE LIBRARY INDEX
..79	* LIBRARY TAPE INDEX
..80	* YYDDD/START OF PROGRAM X
..81	* NEXT PROGRAM IS X
..82	* NEXT PROGRAM IS X WITH SWITCH 2 OFF/Y WITH SWITCH 2 ON
..83	* NEXT PROGRAM SELECTED BY ORDER CARD
..84	* MASTER TAPE STOP
..85	* NEXT PROGRAM XXXXXXXX SELECTED BY ENDED PROGRAM
..95	* MEMORY DUMP OF PROGRAM XXXXXXXX
..96	* ORDER NOT EXECUTED
..97	* ORDER UNKNOWN
1098	* IMPOSSIBLE TO PROCEED/LOAD PILOT 0
2498	* END OF SUBROUTINE TRANSLATION
..99	* END (of Order program)
2299	* END OF PROGRAM XXXXXXXX
6199	* END OF RESTART - NNNN

G. GE-100 SERIES CHARACTER SET

GRAPHIC CHARACTER	INTERNAL CODE		HOLLERITH CARD CODE	BULL CARD CODE
	BINARY VALUE	HEXA VALUE		
0	01000000	40	0	0
1	01000001	41	1	1
2	01000010	42	2	2
3	01000011	43	3	3
4	01000100	44	4	4
5	01000101	45	5	5
6	01000110	46	6	6
7	01000111	47	7	7
8	01001000	48	8	8
9	01001001	49	9	9
[	01001010	4A	2-8	11-1
#	01001011	4B	3-8	9-7-0
@	01001100	4C	4-8	9-8-6
:(colon)	01001101	4D	5-8	9-7-1
>	01001110	4E	6-8	9-8-12
?	01001111	4F	7-8	9-8-5
blank	01010000	50		
A	01010001	51	12-1	7-11
B	01010010	52	12-2	7-0
C	01010011	53	12-3	7-1
D	01010100	54	12-4	7-2
E	01010101	55	12-5	7-3
F	01010110	56	12-6	7-4
G	01010111	57	12-7	7-5
H	01011000	58	12-8	7-6
I	01011001	59	12-9	12-8
&	01011010	5A	12	9-7-5

GRAPHIC CHARACTER	INTERNAL CODE		HOLLERITH CARD CODE	BULL CARD CODE
	BINARY VALUE	HEXA VALUE		
. (period)	01011011	5B	12-3-8	11
]	01011100	5C	12-4-8	9-8-4
(	01011101	5D	12-5-8	9-8-0
<	01011110	5E	12-6-8	12-1
\	01011111	5F	12-7-8	9-7-11
↑	10100000	A0	11-0	11-0
J	10100001	A1	11-1	8-11
K	10100010	A2	11-2	8-0
L	10100011	A3	11-3	8-1
M	10100100	A4	11-4	8-2
N	10100101	A5	11-5	8-3
O	10100110	A6	11-6	12-7
P	10100111	A7	11-7	8-4
Q	10101000	A8	11-8	8-5
R	10101001	A9	11-9	8-6
-(minus or hyphen)	10101010	AA	11	9-8-2
$	10101011	AB	11-3-8	9-7-12
*	10101100	AC	11-4-8	12
)	10101101	AD	11-5-8	9-8-1
;	10101110	AE	11-6-8	9-7-6
'(apostrophe)	10101111	AF	11-7-8	9-12
+	10110000	B0	12-0	9-8-3
/	10110001	B1	0-1	9-7
S	10110010	B2	0-2	9-11
T	10110011	B3	0-3	9-0
U	10110100	B4	0-4	9-1
V	10110101	B5	0-5	9-2
W	10110110	B6	0-6	9-3

GRAPHIC CHARACTER	INTERNAL CODE		HOLLERITH CARD CODE	BULL CARD CODE
	BINARY VALUE	HEXA VALUE		
X	10110111	B7	0-7	9-4
Y	10111000	B8	0-8	9-5
Z	10111001	B9	0-9	9-6
←	10111010	BA	0-2-8	9-7-2
,(comma)	10111011	BB	0-3-8	9-8-11
%	10111100	BC	0-4-8	9-7-4
=	10111101	BD	0-5-8	9-8
"	10111110	BE	0-6-8	9-7-3
!	10111111	BF	0-7-8	12-0

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GE 120/GE 130

EDOS - Extended Disc Operating System
Operator's Manual

Information Systems

GE 100 LINE

BULL

GENERAL ELECTRIC

Code 3918119 M

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GE 120/GE 130

EDOS - Extended Disc Operating System

Operator's Manual

FEBRUARY 1970

BULL
GENERAL ELECTRIC

PREFACE

This manual has been produced by General Electric - Information Systems Italia. The terminology used in this manual is according to the International Federation for Information Processing and the International Computation Centre (IFIP/ICC) Vocabulary of Information Processing.

Suggestions and comments pertaining to form, content, purpose, or use of this manual are invited. Comments may be sent on the Document Review Sheet which appears at the rear of this manual.

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INTRODUCTION

A. SUBJECT OF THE MANUAL

This manual describes operating considerations of the GE-120/GE-130 EDOS (Extended Disc Operating System). It is designed to be used by the operator of this system at the computer, in conjunction with the manuals that describe the peripheral devices or subsystems used with the GE-120/GE-130 Central Processor Unit.

B. HOW TO MAKE MAXIMUM USE OF THE MANUAL

This manual is intended as an aid to the operator at the console. It describes only so much of the system's functioning as effects the operator and as can be affected by him. If a more detailed study of the system and the composition of its elements is required, the programmer's guide to GE-120/GE-130 EDOS should be consulted.

Part I of this manual is a very brief overview of the system. It includes descriptions of the maximum and minimum hardware operating environment, and a brief orientation on software capabilities and functions.

Part II contains a description of the order programs, discussion of the format, and use of generic terms, abbreviations and mnemonics. These provide the operator with his means of communicating with the system, user program processing, error recovery, etc.

Part III is a description of error and informative messages and system halts. These are included to provide the operator with information regarding system reaction to certain specific conditions.

Part IV is a description of the operating controls of a typical system. Described are the control panels of each peripheral device or subsystem in this typical configuration. All the devices which may possibly be connected to the GE-120/GE-130 Central Processing Unit are not described as the system is too large and flexible for such treatment but, if the particular user facility is configured differently, or if the complement is supplemented, additional descriptions may easily be added to this part by the manual user.

The Appendices, which form Part V of this manual, include the Glossary Of Terms, a reading list and the Index.

As this manual is designed primarily as a ready reference work for use at the console, and a more complete programmer's manual exists, the use of this manual for a wide variety of other purposes is limited. A decision would have to be made by using personnel regarding use of this manual over the programmer's version of this manual for any but the intended purpose.

C. RELATED MANUALS AND THEIR IMPORTANCE

As all the computing systems in the GE-100 Line are related, so are the manuals provided for this line related to the computing systems and each other. The specific manuals that are referenced in this book are listed in Appendix B. However, the reader should not assume that this list contains all the reference material available; it contains only the minimum required.

For additional information that may be required, a list of the manuals available for this line should be consulted.

PART I - EDOS SYSTEM DESCRIPTION

A. INTRODUCTION

GE-120/GE-130 EDOS (Extended Disc Operating System) is designed to function with both disc and tape storage units. In minimum configuration it requires : GE-120/GE-130 Central Processor Unit; 12K core store; one card reader; one printer; and either two DSU 160 or one DSU 110 disc unit.

At maximum configuration, GE-120/GE-130 EDOS can service (besides the GE-120/GE-130 Central Processor Unit), 32K core store; one card reader; one card punch; one card reader/punch; one printer; 8 magnetic tape units of the same type; and 16 DSU 160 or 8 DSU 110 disc units. Actually, 16 individual disc packs may be used with EDOS. Only eight DSU 110 units may be connected because each has two independent disc packs.

Assembly and compilation of programs is controlled by EDOS for programs written in APS, COBOL, FORTRAN, RPG, and SPG.

Each of the disc units or actually, disc packs, in the system may be assigned a different name. These names are Master Disc, System Disc, and Library Disc and are determined by the content of each disc unit. Disc units are also assigned the functional names Basic Disc and Work Disc. The Basic Disc contains the entire EDOS and must be either a Master Disc or System Disc; the Work Disc functions as it's name implies and may be a Master Disc, System Disc, or Library Disc although it need not be any of these. In fact, if it is not necessary, no Work Disc need be assigned to the system. A Basic Disc must always be present.

In using the order programs, specific disc units may be accessed in several different ways. The Basic Disc may be accessed by coding BD, SD, MD, or LD. It may also be accessed by coding the select number of the Basic Disc or, when specifying the input or output disc is optional, the Basic Disc may be selected automatically when the field is omitted. The Work Disc may be selected by specifying WD or its select number. Any other disc unit may be accessed by specifying its select number.

Because of the nature of the order programs, it is not possible to use all the order programs with a minimum hardware environment. The user must determine, from each order program description, if it can be used at this particular facility or not.

As regards communication between EDOS and the operator, the main software element is through the order programs. The order programs define EDOS capability and are the medium through which it functions. EDOS response while processing order programs and information input is through a series of system halts and messages. These messages and halts are, in large part controlled by the order programs themselves and the message subroutines.

B. ORDER PROGRAMS

The 92 EDOS order programs may be divided into 11 classes by general function. Different classes may be of varying importance to the operator at various times. In this part of the manual, the classes are described and the component order programs are listed; in Part II, the individual order programs are discribed in alphabetical order.

a. Initialization orders

These order programs are used to initialize the system - to start it functioning; to change the configuration of the system;

write labels; load specific areas; assign select numbers; and generate the Supervisor and Master Disc. The specific order programs in this category are:

.DHW Disc Header Write
.DNA Disc Number Assign
.DRST Disc Restart
.INT System Initialize
.LOAD Load Program
.MDG Master Disc Generate
.MONITOR Monitor Load
.SVG Supervisor Generate
.TLW Tape Label Write
.UAL User Area Load

b. Translation orders

These order programs provide for the translation of source programs from one language to another. Source programs may be written in APS, FORTRAN, COBOL, SPG, or RPG. The specific order programs in this category are:

.APS Assemble APS Program
.COBOL Compile COBOL Program
.DSRC Disc Subroutine Compile
.FOR Compile FORTRAN Program
.RPG Report Program Generate
.SPG Sort Program Generate
.SRC Subroutine Compile

c. Program maintenance orders

This class of order programs is directed toward processing individual user programs which may or may not reside in files.

The processing is concerned only with user programs. By use of order programs in this class, the user may update program labels or programs with or without optimization of store and insert programs from punched cards or store into program files. The order programs in this category are:

.API	Assembled Program Insert
.FTU	File Table Update
.PLU	Program Label Update
.PPI	Punched Program Insert
.PUC	Program Update By Cards
.PUCWS	Program Update By Cards Without Shift

d. Program file maintenance orders

This class of order programs is directed toward processing of program files or programs that exist in files. By using order programs in this class, program files may be opened and closed or deleted, labels may be updated, and programs may be removed from a file with or without optimization of store. The programs in this class include:

.PFCL	Program File Close
.PFD	Program File Define
.PFDL	Program File Delete
.PFU	Program File Label Update
.PLPK	Program Library Pack
.PSTR	Program Strip
.PSTWS	Program Strip Without Shift

e. Data file label definition and maintenance orders

This class of order programs is concerned with data files as opposed to program files. By use of orders in this class all or individual data files may be deleted and files may be defined and their labels updated. Individual order programs are:

.ADFDL All Data Files Delete
.DFDL Data File Delete
.RFD Random File Define
.RFU Random File Label Update
.SFD Sequential File Define
.SFU Sequential File Label Update

f. Subroutine and subroutine library maintenance orders

This class of order programs is concerned only with subroutines, both as individual programs and as elements of a library. The operations which this class of orders performs include: insertion of a subroutine residing in a card deck or in store into a subroutine library; deletion of a subroutine from the library; and elimination of the subroutine library with or without optimization of store. The order programs in this class are:

.CSI Compiled Subroutine Insert
.PSI Punched Subroutine Insert
.SLCL Subroutine Library Close
.SLCWS Subroutine Library Close Without Shift
.SLDL Subroutine Library Delete
.SLDWS Subroutine Library Delete Without Shift
.SSTR Subroutine Strip

g. Debugging orders

The order programs in this class perform a variety of operations which do not properly fit in any other categories. These include: data loading and replacement; preparation of samples; preparation and eventual deletion of test programs; and the loading of test programs.

- .DLD Data Load
- .DRP Data Replace
- .SGE Samples Generate
- .TPG Test Program Generate
- .TPGSC Test Program Generate And Scratch
- .TRACE Load Program By Trace

h. Information duplicate and transfer orders

The order programs in this class transfer information from one store medium to another or make copies of existing information. Duplicate card decks are made; tape reels, program files, and the Supervisor are copied; and information is transferred from disc to tape and tape to disc. Individual order programs are:

- .CDP Cards Duplicate
- .DTAFT Disc To Tape All Files Transfer
- .DTDFA Disc To Tape Data File Add
- .DTDFT Disc To Tape Data File Transfer
- .DTPFA Disc To Tape Program File Add
- .DTPFT Disc To Tape Program File Transfer
- .PFCP Program File Copy
- .PLTR Program Library Transfer
- .PTR Program Transfer
- .SLTR Subroutine Library Transfer
- .STR Subroutine Transfer
- .SVTR Supervisor Transcribe
- .TADD Tape Add
- .TCP Tape Copy
- .TDAFT Tape To Disc All Files Transfer
- .TDDFT Tape To Disc Data File Transfer
- .TDPFT Tape To Disc Program File Transfer

i. Print orders

As the name of this class implies, these order programs are responsible for printing contents of: card decks; data files; disc sectors; file labels; program and subroutine labels; portions of core store; program and subroutine libraries; programs and subroutines; the Supervisor; tape reels; and tape file labels. The order programs are:

.CPRT Card Print
.DFPRT Data File Print
.DSPRT Disc Sectors Print
.FLPRT File Labels Print
.LIST Program And Subroutine Labels List
.MDP Memory Dump
.PLPRT Program Library Print
.PPRT Program Print
.SLPRT Subroutine Library Print
.SPRT Subroutine Print
.SVPRT Supervisor Print
.TDP Tape Dump
.TFLP Tape File Labels Print

j. Punch and punching check orders

Order programs in this class cause punched card information to be output and provide for the checking of such card decks. Information which can be punched and checked includes: assembled or compiled programs and subroutines; individual programs or subroutines residing in a library; and the entire program or subroutine library. Individual order programs are:

.APP Assembled Program Punch
.APPCK Assembled Program Punching Check
.CSP Compiled Subroutine Punch
.CSPCK Compiled Subroutine Punching Check

.LPP Library Program Punch
.LPPCK Library Program Punching Check
.LSP Library Subroutine Punch
.LSPCK Library Subroutine Punching Check
.SLP Subroutine Library Print
.SLPCK Subroutine Library Printing Check

k. Miscellaneous orders

This class consists of one order program, .MDS, and two system functions which, although not order programs, functionally approximate order programs.

.CMT Comment
.HLT Halt
.MDS Master Disc Stop

C. MESSAGE SUBROUTINES

Message output while EDOS is processing can originate in any of several different areas. Those that originate in EIOS are not described in this manual; for information regarding them, refer to the appropriate EIOS manual. Messages may also originate in the order programs themselves, in the Supervisor Auxiliary Module, or in the message subroutines in the subroutine library.

Order program messages are those which are specific to individual order programs. They identify a specific problem or condition and system activity may or may not accompany the message. Response to such activity is described in Part III of this manual.

There are however, a number of messages which are common to a number of order programs. These are processed, for the order programs that use them, by message subroutines in the Supervisor Auxiliary Module and the subroutine library.

a. Supervisor Auxiliary Module

The Supervisor Auxiliary Module (.SPVAUXM) contains three message subroutines which process the most commonly-used condition messages. The subroutines themselves are described in greater detail in Part III of this manual but briefly, the subroutines and their functions are as follows:

*OSDS	Operating System Disc Subroutine This subroutine signals persistent errors in attempting to read from or write on a specific disc unit.
*STAND	Order Card Standardization This subroutine examines order and detail cards to ensure that they are formatted properly as regards position, length and content of required and optional card fields, presence of commas separating fields where required, etc.
*IODC	Input/Output Disc Check This subroutine examines the disc units specified for input and output as to presence and legality for the particular application; checks for the presence of program files when required; checks volume numbers; and causes header labels and volume numbers to be listed.

Because of the function of these subroutines, many order programs require .SPVAUXM to be present as part of the Supervisor before they can begin processing. These order programs may not begin processing if .SPVAUXM is not present.

b. Subroutine library

Among other subroutines in the library are a number of subroutines responsible for error and condition messages common to a number of order programs. They may or may not be in store at any given time depending on a variety of factors including the configuration of the system; the order program which is to be executed, etc. A brief description of each of the message subroutines follows.

*OSTP	Operating System Tape Subroutine This subroutine is similar to *OSDS in that it has equivalent functions which are applied to tape units instead of disc units.
*IOTC	Input/Output Tape Check This subroutine is similar to *IODC in that it has equivalent functions which are applied to tape units instead of disc units.
*SLSS	Subroutine Label Search Subroutine When a particular order program is to process a subroutine, this message subroutine is required to output any error or condition messages necessary.
*PLSS	Program Label Search Subroutine This subroutine performs a function similar to that of *SLSS except that it must be present when access to a particular program is required.

***FDTUP** File Definition Table Update

This subroutine processes the file table updating information input by means of the LBC card. The messages it outputs are relative to that processing.

PART II - ORDER CARD DESCRIPTIONS

This part of the manual describes the EDOS order and detail cards. These are used to cause the system to react in various ways - in fact, to make EDOS function. The descriptions in this part of the manual are quite brief but are considered sufficient to permit successful operation of the system. If any additional information regarding operation of any of the order programs is required, the Programmer's Manual should be consulted.

This part begins with a discussion of the general format of the order program descriptions. This is followed by the order program descriptions themselves, in alphabetical order. The third section of this part describes the function of the generic terms which appear in the order card format descriptions in Section B in this part.

A. DESCRIPTION FORMAT

At the beginning of each description in Section B appear the mnemonic name of the order program and its title. Following this is a brief statement of its function. The function statement, because of its brevity, cannot always explain all the processing considerations that may be involved. For a fuller description of these, the Programmer's Manual should be consulted.

The order card format follows. This indicates the order in which the various required and optional fields must be arranged in the order card. To use an example for illustration, the order card format of .PSTR, Program Strip, is as follows:

$$.\text{PSTR}\ \left[,\text{OD}=\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{LD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right], \left\{\begin{matrix}\text{TP=pgm name}\\ \text{pgm name}\end{matrix}\right\}, \left[\left\{\begin{matrix}\text{TP=pgm name}\\ \text{pgm name}\end{matrix}\right\}\right]\ldots$$

This indicates that .PSTR must be punched in the first five columns of the order card. The [ ] type brackets indicate that the following OD field is optional. It may appear in the order card or it may not but if it does appear, the comma character must be included. The { } type brackets indicate that one of the items enclosed within must be selected. For example : OD=SD. Enclosing the { } type brackets in the [ ] type brackets indicates that use of the former field is optional, but when it is used, one of the items in the { } type brackets within must be selected.

The comma following the optional field is not enclosed in brackets and so, must always appear. The field following the required comma is enclosed in { } type brackets which indicates that the field is required and either of the two items may be selected. The following field is exactly the same except that it is also enclosed in [ ] type brackets which indicates that its use is optional but is used, one of the two items enclosed in the { } brackets must be selected. The three period characters following the last item indicate that this item may be repeated in the order card as many times as required, subject to the limitations included elsewhere in the order program description.

Use of optional and required fields may have the effect of changing the appearance of the order card. For example, all the following are correctly formatted for this order card.

```
.PSTR, OD=BD, PROG1, PROG2, PROG3, PROG4
.PSTR, PROG3
.PSTR, OD=A, PROG2
.PSTR, PROG1, PROG2
```

Required Card Fields is the next category. It is present when the order card contains required card fields and absent when it does not. The information given includes the form the field may take in the order card, if there are options available, and the significance of each of these options. If any generic terms are present in these fields, the required replacement for the generic term is also described.

Optional Card Fields is the following category. Descriptions in this category are the same as those for required fields except of course, the fields described here are optional to the order program.

Some order programs require detail cards or an entire input deck to process. When this is the case, an illustration of a typical deck is provided. This exploded deck view shows the manner in which order and detail cards must be arranged for input. Each detail card is then described in a manner similar to that of the order cards. If any particular considerations are to be observed in the use of any detail card, these are included with the card description.

Peripheral devices required by the order program are then described. This section indicates the type and minimum number of each device that is required to completely execute the order program described. If these devices are not available, the order program may not be executed.

The final section is Specific Condition Messages. This category consists of those messages that are distinctly output by the order program rather than by one of the Pilots or a special message routine. Such messages generally indicate that a problem specific to the order program in execution exists rather than a problem which may be specific to the system or caused by any number of general conditions.

B. ORDER PROGRAM DESCRIPTIONS

On the following page begin the descriptions of the EDOS order programs. These are arranged in alphabetical order.

.ADFDL All Data Files Delete

Function:

Deletes all data files from a specific volume.

Order Card Format:

$$\text{.ADFDL,} \left\{ \begin{array}{l} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{array} \right\} \text{, vol no.}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, LD, BD	Data files are on the Basic Disc.
WD	Data files are on the Work Disc.
0 . . . F	Data files are on the unit whose select number is specified.

.ADFDL

CONTENT	FORMAT OR INDICATION
vol no.	This field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Printer	1
Card reader	1

Specific Condition Messages:

```
* OS *  48130 *  SPACE TABLE OVERFLOW
* OS *  48136 *  DATA FILES ABSENT
* OS *  48999 *  END OF .ADFDL
```

.API Assembled Program Insert

Function:

Moves an assembled program from the work area of a compiler or assembler into the program file on the same or another disc unit.

Order Card Format:

$$.\mathrm{API}\quad \left[,\mathrm{ID}=\left\{\begin{matrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{LD}\\ \mathrm{WD}\\ 0\\ .\\ .\\ .\\ \mathrm{F}\end{matrix}\right\}\right]\quad \left[,\mathrm{OD}=\left\{\begin{matrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{LD}\\ \mathrm{WD}\\ 0\\ .\\ .\\ .\\ \mathrm{F}\end{matrix}\right\}\right]\qquad ,\text{pgm name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

.API

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program is on the Basic Disc. The Basic Disc may not be a Master Disc.
ID=WD	Program is on the Work Disc.
ID=0 . . . F	Program is on the disc unit whose select number is specified. The select number of a Master Disc may not be coded.
OD=SD, BD, LD	Program file is on the Basic Disc. The Basic Disc may not be a Master Disc.
OD=WD	Program file is on the Work Disc.
OD=0 . . . F	Program file is on the disc unit whose select number is specified. The select number of a Master Disc may not be coded.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 29120 * PROGRAM FILE OVERFLOW
* OS * 29121 * PROGRAM FILE EMPTY
* OS * 29131 * WORK SPACE OVERFLOW
* OS * 29153 * PN=XXXXXXXX NOT FOUND
* OS * 29902 * OD=X : ...
* OS * 29903 * PROGRAM LABEL : ...
* OS * 29999 * END OF .API
```

.APP Assembled Program Punch

Function:

Punches a specific segment or segments of an assembled program or an entire assembled program located in the work area of a compiler or assembler.

Order Card Format:

$$.\text{APP} \left[,\text{ID}= \left\{ \left[\begin{array}{c} \text{SD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F} \end{array} \right] \right\} \right] ,\text{pgm name} \quad \left[,\text{SG=seg no.} \right] \left[,\text{punch code} \right]$$

$$\left[,\text{SS=start seg no.} \right] \quad \left[,\text{HX=} \left\{ \left[\begin{array}{c} \text{Y}\\ \text{N} \end{array} \right] \right\} \right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program is on the Basic Disc. The Basic Disc may not be a Master Disc.
ID=WD	Program is on the Work Disc.
ID=0 . . . F	Program is on the unit whose select number is specified. The select number of a Master Disc may not be coded.
SG=seg no.	The seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
punch code	This field is 4 alphanumeric characters long.
SS=start seg no.	The start seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
HX=Y	Cards are punched in hexadecimal format.
HX=N	Cards are punched in the normal format.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card punch	1
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 30131 * WORK SPACE OVERFLOW
*OS * 30146 * SG=XX NOT FOUND
*OS * 30153 * PN=XXXXXXXX NOT FOUND
*OS * 30155 * PUNCH NOT CONNECTED
*OS * 30903 * PROGRAM LABEL : ...
*OS * 30999 * END OF .APP
```

.APPCK Assembled Program Punching Check

Function:

Compares the punched copy of an assembled program segment or segments or an entire assembled program with a copy of the same information in the compiler or assembler work area.

Order Card Format:

$$\text{.APPCK}\ \left[\text{, ID=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right]\text{, pgm name}\ \left[\text{, SG=seg no.}\right]\left[\text{, punch code}\right]$$

$$\left[\text{, SS=start seg no.}\right]\ \left[\text{, HX=}\left\{\begin{bmatrix}\text{Y}\\ \text{N}\end{bmatrix}\right\}\right]$$

Required Card Fields:

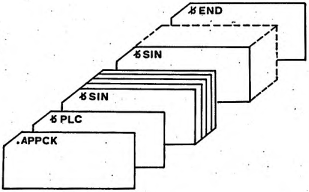
CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

.APPCK

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Work area is on the Basic Disc. The Basic Disc may not be a Master Disc.
ID=WD	Work area is on the Work Disc.
ID=0 . . . F	Work area is on the unit whose select number is specified. The select number of a Master Disc may not be coded.
SG=seg no.	The seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
punch code	This field is 4 alphanumeric characters long.
SS=start seg no.	The start seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
HX=Y	Cards to be checked are punched in hexadecimal format.
HX=N	Cards to be checked are punched in the normal format.

Input Card Deck Example:



Detail Card Formats:

1. PLC (Program Label Control) Card
   This card must precede the object program deck being checked.

COLUMNS	CONTENTS
1 - 4	ƀPLC
5	1 or 3.
6 - 13	Name of the program checked.
14	BIOS code.
15 - 23	Blank

.APPCK

COLUMNS	CONTENTS
24 - 27	Program file table address (in hexadecimal).
28 - 31	Program load address (in hexadecimal).
32 - 35	First available address after the end of the program (in hexadecimal).
36 - 37	ȸȸ
38 - 42	Date in the form YYDDD (in decimal).
43	U for a utility program; ȸ for all other type programs.
44 - 47	Program beginning address (in hexadecimal).
48 - 80	Blank

2. SIN (Segment Insert) Card
At least one of these cards must always appear; any additional are optional depending on whether the program being checked is divided into segments; a SIN card must be used preceding each segment.

COLUMNS	CONTENTS
1 - 4	ȸSIN
5	1 or 3.
6 - 13	Name of the program checked.
14 - 19	Blank

COLUMNS	CONTENTS
20 - 21	Segment number (in decimal).
22 - 32	Blank
33 - 36	Number (in decimal) of cards in the preceding program segment. If this is the first segment of a program or the only segment being checked, this field is left blank.
37	ƀ
38 - 42	Date in the form YYDDD (in decimal).
43 - 80	Blank

3. END Card

This card is used to signal the fact that the entire deck to be processed by this order has been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 32	Blank
33 - 36	Number (in decimal) of cards in the last segment checked.
37 - 80	Blank

4. Object Program Information Card
The assembled program to be checked must have its object information cards formatted as follows:

COLUMNS	CONTENTS
1 - 4	Object program punching code.
5 - 6	Number (in hexadecimal) of characters in columns 11 to 70.
7 - 10	Object information store address (in hexadecimal).
11 - 70	Object information.
71 - 74	Position number (in decimal) of this card in this segment.
75 - 78	Date in the form YDDD (in decimal).
79 - 80	Segment number.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 30131 *  WORK SPACE OVERFLOW
*OS * 30146 *  SG=XX NOT FOUND
*OS * 30153 *  PN=XXXXXXXX NOT FOUND
*OS * 30158 *  PUNCH ERROR ON ** CARD
*OS * 30903 *  PROGRAM LABEL : ...
*OS * 30999 *  END OF .APPCK
```

.APS Assemble APS Program

Function:

Assembles a source program coded in APS into machine language.

Order Card Format:

$$.APS,\ \text{pgm name}\ \left[\text{, ID=}\left\{\begin{bmatrix}SD\\BD\\WD\\0\\.\\.\\.\\F\end{bmatrix}\right\}\right]\left[\text{,OD=}\left\{\begin{bmatrix}SD\\BD\\WD\\0\\.\\.\\.\\F\end{bmatrix}\right\}\right]\left[\text{,NL}\right]$$

$$\left[\text{, CM=character string}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Program to be assembled is on the Basic Disc.
ID=WD	Program to be assembled is on the Work Disc.
ID=0 ... F	Program to be assembled is on the unit whose select number is specified. The number of only a System Disc may be coded.
OD=SD, BD	Object program is output on the Basic Disc.
OD=WD	Object program is output on the Work Disc.
OD=0 ... F	Object program is output on the unit whose select number is specified. The number of only a System Disc may be coded.
NL	Object listing is not required during assembly.
CM=character string	The character string portion of this field is a maximum of 30 alphanumeric characters.

Peripheral Devices Required:

This list does not include those devices that may be required by the APS assembler or in execution of the object program.

DEVICE	QUANTITY
Disc unit	1, 2 or 3
Card reader	1
Printer	1

.APS

Specific Condition Messages:

For a listing of these messages, refer to the appropriate APS manual.

.CDP Cards Duplicate

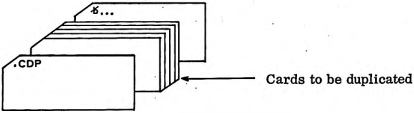
Function:

Punches a duplicate of the input card deck.

Order Card Format:

.CDP

Input Card Deck Example:



Detail Card Formats:

1. ȸ... Card
   This card is used to indicate that all the cards to be processed by this order have been read.

.CDP

COLUMNS	CONTENTS
1 - 4	b̸...
5 - 80	Not examined by EDOS.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Card punch	1
Printer	1

Specific Condition Messages:

```
* OS * 28155 * PUNCH NOT CONNECTED
* OS * 28999 * END OF .CDP
```

.CMT Comment

Function:

Permits the programmer to insert comments which will be listed at the printer when this card is encountered in the input deck.

Order Card Format:

.CMT character string

Required Card Field:

CONTENT	FORMAT OR INDICATION
character string	This field may not extend past column 72 in the order card.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

.CMT

Specific Condition Messages:

No condition messages are output during processing.

.COBOL Compile COBOL Program

Function:

Compiles a source program coded in COBOL into a machine language program.

Order Card Format:

$$\text{.COBOL}\left[\text{, ID=}\left\{\begin{array}{l}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{array}\right\}\right]\text{, PN=pgm name}\left[\text{, FN=file name}\right]\left[\text{, OD=}\left\{\begin{array}{l}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{array}\right\}\right]$$

$$\left[\text{, OL}\right]\left[\text{, OS=obj pgm adr}\right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Source program is on the Basic Disc.
ID=WD	Source program is on the Work Disc.
ID=0. . . F	Source program is on the unit whose select number is specified.

.COBOL

CONTENT	FORMAT OR INDICATION
PN=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.
OD=SD, BD	Object program is output on the Basic Disc.
OD=WD	Object program is output on the Work Disc.
OD=0...F	Object program is output on the unit whose select number is specified.
OL	A listing is to be output while the source program is being compiled.
OS=obj pgm adr	The obj pgm adr portion of this field is 5 numeric characters long.

Peripheral Devices Required:

This list does not include those devices that may be required by the COBOL compiler or in execution of the object program.

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

For a description of messages output while processing this order, refer to the appropriate COBOL manual.

.CPRT Card Print

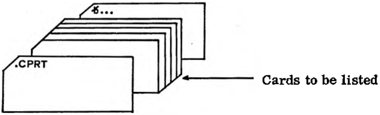
Function:

Lists a card or card deck at the printer.

Order Card Format:

.CPRT

Input Card Deck Example:



Detail Card Formats:

1. b̸... Card
   This card is used to indicate that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀ...
5 - 80	Not examined by EDOS.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

* OS * 27999 * END OF .CPRT

.CSI Compiled Subroutine Insert

Function:

Moves an APS-assembled subroutine from the disc work area used by the assembler into a subroutine library.

Order Card Format:

$$.\mathrm{CSI}\ \left[,\mathrm{ID}=\left\{\begin{matrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \mathrm{F}\end{matrix}\right\}\right]\left[,\mathrm{OD}=\left\{\begin{matrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \mathrm{F}\end{matrix}\right\}\right],\ \text{subr name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD,BD	Subroutine to be inserted is on the Basic Disc.
ID=WD	Subroutine to be inserted is on the Work Disc.
ID=0 . . . F	Subroutine to be inserted is on the disc unit whose select number is specified.
OD=SD, MD, BD, LD	Subroutine is to be inserted on the Basic Disc.
OD=WD	Subroutine is to be inserted on the Work Disc.
OD=0 . . . F	Subroutine is to be inserted on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 42161 * SR=XXXXXX NOT FOUND
* OS * 42163 * SOURCE STATEMENT WRONG
* OS * 42167 * SR=XXXXXX ADDRESS WRONG
* OS * 42902 * OD=X : HDR1 ...
* OS * 42999 * END OF .CSI
```

.CSP Compiled Subroutine Punch

Function:

Punches an APS-assembled subroutine located in the disc work area used by the APS assembler.

Order Card Format:

$$\text{.CSP} \left[\text{, ID=} \left\{ \left[\begin{array}{l} \text{SD} \\ \text{BD} \\ \text{WD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{array} \right] \right\} \right] \text{, subr name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine is on the Basic Disc. The Basic Disc must be a System Disc.
ID=WD	Subroutine is on the Work Disc.
ID=0 ... F	Subroutine is on the unit whose select number is specified. The number coded may represent only a System Disc.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Card punch	1
Printer	1

Specific Condition Messages:

```
* OS * 42155 * PUNCH NOT CONNECTED
* OS * 42161 * SR=XXXXXX NOT FOUND
* OS * 42163 * SOURCE STATEMENT WRONG
* OS * 42167 * SR=XXXXXX ADDRESS WRONG
* OS * 42999 * END OF .CSP
```

.CSPCK Compiled Subroutine Punching Check

Function:

Compares the punched copy of a subroutine with a copy of that subroutine residing in the disc work area used by the assembler.

Order Card Format:

$$\text{.CSPCK} \quad \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{BD} \\ \text{WD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \right] \quad \text{, subr name}$$

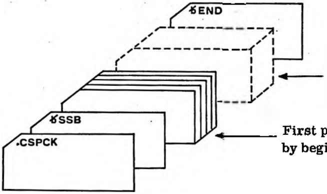
Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine is on the Basic Disc. The Basic Disc must be a System Disc.
ID=WD	Subroutine is on the Work Disc.
ID=0 . . . F	Subroutine is on the unit whose select number is specified. The number of only a System Disc may be coded.

Input Card Deck:



Second and following pages to be checked, each preceded by beginning page card.

First page to be checked preceded by beginning page card.

.CSPCK

Detail Card Formats:

1. SSB (Start Subroutine) Card
   This card precedes the card deck containing the subroutine to be checked.

COLUMNS	CONTENTS
1 - 4	ȸSSB
5 - 6	Number (in hexadecimal) of characters in this card in columns 1-52.
7 - 12	Name of the subroutine.
13 - 16	Number (in unpacked binary) of characters in the subroutine.
17 - 52	Names of the subroutines which this subroutine may call; the subroutine names begin in columns 17, 23, 29, 35, 41, and 47.
53 - 62	Blank
63	N for a normal subroutine; D for a disc subroutine.
64 - 80	Blank

2. Page Beginning Card
   This card identifies the beginning of a page in store. All the information following this card, until the next page beginning card is encountered, will be written on one page in store.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of compilation in the form YYDDD (in decimal).
13 - 16	0001
17 - 18	Number (in hexadecimal) of characters in this card in columns 1-69.
19 - 57	Names of the subroutines which this subroutine may call, each in a 7 character format.
58 - 61	Blank
62 - 65	Number (in decimal) of characters in this page of the subroutine.
66 - 69	Address (in hexadecimal) at which this page begins.
70 - 80	Blank

3. Object Program Card
This type card contains the actual text of the subroutine.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank

COLUMNS	CONTENTS
8 - 12	Date of compilation in the form YYDDD (in decimal).
13 - 16	Number (in decimal) of this card in the portion of the input deck intended for this page. The card following the page beginning card should be numbered 0002.
17 - 18	Number (in hexadecimal) of characters in this card.
19 - 80	Object program data.

4. END Card
This card inidicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS  * 42158  * PUNCH ERROR ON **   CARD
*OS  * 42161  * SR=XXXXXX NOT FOUND
*OS  * 42163  * SOURCE STATEMENT WRONG
*OS  * 42167  * SR=XXXXXX ADDRESS WRONG
*OS  * 42999  * END OF .CSPCK
```

.DFDL Data File Delete

Function:

Eliminates a data file from a specific volume.

Order Card Format:

```
              ┌SD ┐
              │MD │
              │BD │
              │LD │
 .DFDL,      {│WD │}     , vol no., file name
              │0  │
              │.  │
              │.  │
              │.  │
              └F  ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	File is on the Basic Disc.
WD	File is on the Work Disc.
0 . . . F	File is on the unit whose select number is specified.

CONTENT	FORMAT OR INDICATION
vol no.	This field is a maximum of 6 alphanumeric characters.
file name	This field is a maximum of 12 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 48130 * SPACE TABLE OVERFLOW
* OS * 48134 * FN=XXXXXXXXXXXX NOT FOUND
* OS * 48136 * DATA FILES ABSENT
* OS * 48999 * END OF .DFDL
```

.DFPRT Data File Print

Function:

Lists a specific file, with or without an overflow zone, or a specific sector of a file or overflow zone at the printer.

Order Card Format:

$$\text{.DFPRT} \left[\text{, ID=} \left\{ \begin{matrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{matrix} \right\} \right] , \left\{ \begin{matrix} \text{AN} \\ \text{HX} \end{matrix} \right\} \text{, file name} \left[\text{, OV} \right]$$

$$\left[\text{, FS=first sect} \right] \left[\text{, SN=no. sect} \right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
AN	Information is listed in alphanumeric form.

CONTENT	FORMAT OR INDICATION
HX	Information is listed in hexadecimal form.
file name	This field is a maximum of 12 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	File is on the Basic Disc.
ID=WD	File is on the Work Disc.
ID=0 . . . F	File is on the unit whose select number is specified.
OV	The file's overflow zone only is to be output.
FS=first sect	The first sect portion of this field is a maximum of 5 numeric characters.
SN=no. sect	The no. sect portion of this field is a maximum of 5 numeric characters and is coded in decimal.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.DFPRT

Specific Condition Messages:

```
* OS *  26148 *  SN=XXXXX WRONG
* OS *  26149 *  OVERFLOW AREA NOT PRESENT
* OS *  26999 *  END OF .DFPRT
```

.DHW Disc Header Write

Function:

Writes the header of the specified disc unit indicating the faulty tracks on that unit and their alternates and copies the cylinder zero from one disc unit onto another.

Order Card Format:

```
                  ┌ SD ┐
                  │ MD │
                  │ BD │        ┌ WD ┐
                  │ LD │        │ 0  │
.DHW  [ ,ID=  {   │ WD │ } ] ,  {  .  }    ,vol no., user name
                  │ 0  │        │ .  │
                  │ .  │        │ .  │
                  │ .  │        └ F  ┘
                  │ .  │
                  └ F  ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
WD	Information is copied on the Work Disc.
0 . . . F	Information is copied on the unit whose select number is specified.

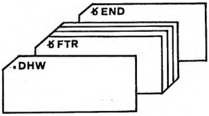
. DHW

CONTENT	FORMAT OR INDICATION
vol no.	This field is a maximum of 6 alphanumeric characters.
user name	This field is 12 alphanumeric characters long.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Information is copied from the Basic Disc.
ID=WD	Information is copied from the Work Disc.
ID=0. . . F	Information is copied from the unit whose select number is specified.

Input Card Deck Example:



Detail Card Formats:

1. FTR (Faulty Track) Card

   This card gives the addresses of those tracks which may not be used on the disc on which header information is being copied. As many FTR cards as required to list all the faulty tracks may be used.

COLUMNS	CONTENTS
1 - 4	ƀFTR
5 - 80	Addresses of the faulty tracks on the disc on which information is being copied. Each address is 4 numeric characters long; the first 3 characters represent the cylinder number, the last character represents the recording surface within that cylinder.

2. END Card

   This card signals the end of the card deck used by the order program and it must be present whether any FTR cards are coded or not.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Not examined by EDOS.

.DHW

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2 or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS *  21003 *  DU=X : OUT OF ORDER
* OS *  21100 *  INVALID DETAIL CARD
* OS *  21400 *  ALTERNATE TRACK XXXX WRONG
* OS *  21401 *  FAULTY TRACK XXXX - ALTERNATE TRACK XXXX
* OS *  21402 *  FAULTY TRACK : TRACK XXXX WRONG
* OS *  21403 *  FAULTY DISC : ALTERNATE TRACK CAPACITY
                    OVERFLOW
* OS *  21404 *  FAULTY DISC : HEADER WRITE/VERIFY ERROR
                    ON TRACK XXXX
* OS *  21405 *  FAULTY DISC : DATA WRITE/VERIFY ERROR
                    ON TRACK XXXX
* OS *  21999 *  END OF .DHW
```

.DLD **Data Load**

Function:

Loads alphanumeric, hexadecimal or object program information stored in a card deck onto a specific disc unit.

Order Card Format:

$$\text{.DLD,}\left\{\left[\begin{matrix}\text{SD}\\\text{MD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\\cdot\\\cdot\\\cdot\\\text{F}\end{matrix}\right]\right\},\ \left\{\left[\begin{matrix}6\\8\end{matrix}\right]\right\},\ \left\{\left[\begin{matrix}\text{AN}\\\text{HX}\\\text{OP}\end{matrix}\right]\right\}\ \left[\text{, LC=last cyl}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	Data is to be loaded on the Basic Disc.
WD	Data is to be loaded on the Work Disc.
0 . . . F	Data is to be loaded on the unit whose select number is specified.

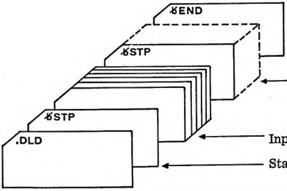
.DLD

CONTENT	FORMAT OR INDICATION
6	Data is to be written in 6-bit mode.
8	Data is to be written in 8-bit mode.
AN	Data is alphanumeric.
HX	Data is hexadecimal.
OP	Data is an object program.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
LC=last cyl.	The last cyl. portion of this field is 3 numeric characters long and has a maximum value of 039 for a DSU 110 unit and 199 for a DSU 160 unit.

Input Card Deck Example:



Start page card for second page and additional page decks.

Input deck for first page

Start page card for first page

Detail Card Formats:

1. STP (Start Page) Card
   This card is used preceding every portion of the input deck that is to be written on a new page. The cards that follow the STP card are to appear on the same page.

COLUMNS	CONTENTS
1 - 4	ƀSTP
5 - 9	Address (in decimal) of the sector at which the page begins.
10 - 13	Number (in decimal) of cards in the deck following, up to but not including the next STP Card or END Card.
14 - 80	Blank

2. END Card
   This card indicates that all cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

3. Alphanumeric Information Input Card:
When alphanumeric data is to be loaded, information in the card deck must be in the following format.

COLUMNS	CONTENTS
1 - 4	Sequence number (in decimal) of this card in the deck for a specific page.
5 - 6	Number (in decimal) of characters to be loaded from this card (1 to 64).
7 - 70	Data to be written. Each column represents one character written on the disc.
71 - 80	Blank

4. Hexadecimal Information Input Card:
When heaxadecimal data is to be loaded, information in the card deck must be in the following format.

COLUMNS	CONTENTS
1 - 4	Sequence number (in decimal) of this card in the deck for a specific page.
5 - 6	Number (in decimal) of characters to be loaded from this card (1 to 32).
7 - 70	Data to be written. Each column represents one character written on the disc. A hexadecimal digit may be stored in alphanumeric form by using a pair of columns with the character punched in the right column and a period character punched in the left column.
71 - 80	Blank

5. Object Program Input Card:
When an object program is to be loaded, information in the card deck must be in the following format.

COLUMNS	CONTENTS
1 - 4	Program punch code.
5 - 6	Number (in hexadecimal) of characters in the object information field.
7 - 10	Address (in hexadecimal) at which the object information is to be loaded.
11 - 70	Object program information.
71 - 74	Sequence number (in decimal) of this card in this segment.
75 - 78	Date of compilation in the form YDDD (in decimal).
79 - 80	Number (in decimal) of this segment.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.DLD

Specific Condition Messages:

```
* OS * 24100 * INVALID DETAIL CARD
* OS * 24103 * INVALID CARD DATA
* OS * 24105 * CARD COUNT WRONG
* OS * 24106 * CARD SEQUENCE ERROR
* OS * 24107 * CARD CODE WRONG
* OS * 24143 * RM=6 WRONG
* OS * 24148 * SN=XXXXX WRONG
* OS * 24999 * END OF .DLD
```

.DNA Disc Number Assign

Function:

Assigns select numbers to the disc units physically connected to the system.

Order Card Format:

```
.DNA    [ , character string ]
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
character string	Sixteen character string of select numbers to be assigned to the disc units connected to the system. This field uses alphanumeric characters which may be the blank character, the numbers 0 through 9, and the letters A through F.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 to 16
Card reader	1
Printer	1

. DNA

Specific Condition Messages:

```
* OS * 04205 * DU=X MULTIPLE
* OS * 04206 * DU=X WRONG
* OS * 04207 * DU NOT CONNECTED
* OS * 04208 * IMPOSSIBLE TO PROCEED/LOAD PILOT ZERO
* OS * 04209 * ORDER CARD WRONG
* OS * 04999 * END OF . DNA
```

.DRP Data Replace

Function:

Replaces one or more adjacent characters in a sector.

Order Card Format:

$$\text{.DRP, } \left\{\begin{bmatrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix}\right\}, \left\{\begin{bmatrix} 6 \\ 8 \end{bmatrix}\right\}, \left\{\begin{bmatrix} \text{AN} \\ \text{HX} \end{bmatrix}\right\}\text{, sect adr, inf length, char no.,}$$

inf string

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	Replacement occurs on the Basic Disc.
WD	Replacement occurs on the Work Disc.

.DRP

CONTENT	FORMAT OR INDICATION
0 . . . F	Replacement occurs on the disc whose select number is specified.
6	Data is to be written in 6-bit mode.
8	Data is to be written in 8-bit mode.
AN	Replacing data is alphanumeric.
HX	Replacing data is hexadecimal.
sect adr	This field is 5 numeric characters long.
inf length	This field is a maximum of 2 numeric characters long and may be in the range of 1 to 32 for alphanumeric characters and 1 to 16 for hexadecimal characters.
char no.	This field is up to 3 numeric characters long and may be in the range of 1 to 384 for 6-bit sectors and 1 to 288 for 8-bit sectors.
inf string	This field is up to 32 alphanumeric or up to 16 hexadecimal characters long.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 25103 * INVALID CARD DATA
* OS * 25104 * CARD DATA LENGTH WRONG
* OS * 25142 * DF=OP NOT ACCEPTED
* OS * 25143 * RM=6 WRONG
* OS * 25150 * SECTOR OVERFLOW
* OS * 25999 * END OF .DRP
```

.DRST Disc Restart

Function:

Permits restarting the execution of a program whose execution has been suspended in a prescribed manner at a certain point.

Order Card Format:

```
                     ┌    ┐
                     │ SD │
                     │ MD │
                     │ BD │
                     │ WD │
.DRST   [,ID=  {     │ 0  │  } ]  ,pgm name
                     │ .  │
                     │ .  │
                     │ .  │
                     │ F  │
                     └    ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field may be a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD	Program and related information resides on the Basic Disc.
ID=WD	Program and related information resides on the Work Disc.
ID=0 . . . F	Program and related information resides on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS*  69999*  END OF .DRST
```

.DSPRT Disc Sectors Print

Function:

Lists the disc sector or sectors specified at the printer.

Order Card Format:

$$\text{.DSPRT}\ \left[\text{, ID=}\left\{\begin{array}{c}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{array}\right\}\right],\ \left\{\begin{array}{c}6\\ 8\end{array}\right\},\ \left\{\begin{array}{c}\text{AN}\\ \text{HX}\end{array}\right\}\ \text{, sect adr}$$

$$\left[,\ \left\{\begin{array}{l}\text{LS=sect adr}\\ \text{SN=no. sect}\end{array}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
6	Data is stored in 6-bit mode.
8	Data is stored in 8-bit mode.

CONTENT	FORMAT OR INDICATION
AN	Data stored is alphanumeric.
HX	Data stored is hexadecimal.
sect adr	This field is 5 numeric characters long and is coded in decimal.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Data to be listed is on the Basic Disc.
ID=WD	Data to be listed is on the Work Disc.
ID=0 . . . F	Data to be listed is on the unit whose select number is specified.
LS=sect adr	The sect adr portion of this field is 5 numeric characters long and is coded in decimal.
SN=no. sect	The no. sect portion of this field is 5 numeric characters long and is coded in decimal.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.DSPRT

Specific Condition Messages:

```
*OS  * 26148  * SN=XXXXX WRONG
*OS  * 26999  * END OF .DSPRT
```

.DSRC Disc Subroutine Compile

Function:

Assembles an EIOS disc subroutine coded in APS into machine language.

Order Card Format:

$$\text{.DSRC, subr name}\ \left[\text{, ID=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right]\ \left[\text{, OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right]\ \left[\text{, NL}\right]$$

$$\left[\text{, CM=character string}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is 5 alphanumeric characters long.

.DSRC

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	EIOS disc subroutine to be assembled is on the Basic Disc.
ID=WD	EIOS disc subroutine to be assembled is on the Work Disc.
ID=0 ... F	EIOS disc subroutine to be assembled is on the unit whose select number is specified.
OD=SD, BD	Object disc subroutine is output on the Basic Disc.
OD=WD	Object disc subroutine is output on the Work Disc.
OD=0 ... F	Object disc subroutine is output on the unit whose select number is specified.
NL	No object program listing is to be output during assembly.
CM=character string	The character string portion of this field is a maximum of 30 alphanumeric characters.

Peripheral Devices Required:

This list does not include those devices that may be required by the APS assembler or in execution of the object disc subroutine.

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

Specific Condition Messages:

For a listing of these messages, refer to the appropriate APS manual.

.DTAFT Disc To Tape All Files Transfer

Function:

Rewrites all files existing on a specific disc onto a specific tape reel.

Order Card Format:

$$.\mathrm{DTAFT}\ \left[\ ,\mathrm{ID}=\left\{\begin{matrix}\mathrm{SD}\\\mathrm{MD}\\\mathrm{BD}\\\mathrm{LD}\\\mathrm{WD}\\0\\.\\.\\.\\\mathrm{F}\end{matrix}\right\}\left[\ ,\mathrm{VN{=}vol\ no.}\right]\right]\ ,\mathrm{OT}=\left\{\begin{matrix}1\\.\\.\\.\\8\end{matrix}\right\}\left[\ ,\mathrm{VN{=}vol\ no.}\right]$$

$$,\left\{\begin{matrix}\mathrm{P}\\\mathrm{O}\end{matrix}\right\}\ ,\ \left\{\begin{matrix}\mathrm{K}\\\mathrm{L}\\\mathrm{M}\\\mathrm{N}\end{matrix}\right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
OT=1 ... 8	Files are to be written on the tape unit whose select number is specified.

CONTENT	FORMAT OR INDICATION
P	Odd parity is checked.
O	Even parity is checked.
K	Files are written at 1600 bpi.
L	Files are written at 800 bpi.
M	Files are written at 556 bpi.
N	Files are written at 200 bpi.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Files are on the Basic Disc.
ID=WD	Files are on the Work Disc.
ID=0 . . . F	Files are on the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

.DTAFT

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

No specific messages are output by this order program during processing.

.DTDFA Disc To Tape Data File Add

Function:

Adds an existing disc file to the end of another file existing on tape by writing the contents of the disc file at the end of the tape file making all appropriate adjustments in labels, tape marks, etc.

Order Card Format:

$$\text{.DTDFA} \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{bmatrix} \right\} \left[\text{, VN=vol no.} \right] \right] \text{, disc file name,}$$

$$\text{OT=} \left\{ \begin{bmatrix} 1 \\ \cdot \\ \cdot \\ \cdot \\ 8 \end{bmatrix} \right\} \left[\text{, VN=vol no.} \right] \text{ , } \left\{ \begin{bmatrix} \text{P} \\ \text{O} \end{bmatrix} \right\} \text{, } \left\{ \begin{bmatrix} \text{K} \\ \text{L} \\ \text{M} \\ \text{N} \end{bmatrix} \right\}$$

.DTDFA

Required Card Fields:

CONTENT	FORMAT OR INDICATION
disc file name	This field is a maximum of 12 alphanumeric characters.
OT=1 ... 8	Data file to be added to is on the unit whose select number is specified.
P	Odd parity is checked during writing.
O	Even parity is checked during writing.
K	File is written at 1600 bpi.
L	File is written at 800 bpi.
M	File is written at 556 bpi.
N	File is written at 200 bpi.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Data file to be added is on the Basic Disc.
ID=WD	Data file to be added is on the Work Disc.
ID=0 ... F	Data file to be added is on the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
* OS * 54134 * FN=XXXXXXXXXXXX NOT FOUND
* OS * 54135 * FN=XXXXXXXXXXXX WRONG
```

. DTDFT Disc To Tape Data File Transfer

Function:

Rewrites a data file existing on a specific disc, onto a specific tape reel, which contains no information before processing begins.

Order Card Format:

$$\text{. DTDFT} \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \left[\text{, VN=vol no.} \right] \right] \text{, file name,}$$

$$\text{OT=} \left\{ \begin{bmatrix} 1 \\ . \\ . \\ . \\ 8 \end{bmatrix} \right\} \left[\text{, VN=vol no.} \right] \text{, } \left\{ \begin{bmatrix} \text{P} \\ \text{O} \end{bmatrix} \right\} \text{, } \left\{ \begin{bmatrix} \text{K} \\ \text{L} \\ \text{M} \\ \text{N} \end{bmatrix} \right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
file name	This field is a maximum of 12 alphanumeric characters.
OT=1 ... 8	File is to be written on the tape unit whose select number is specified.
P	Odd parity is checked.
O	Even parity is checked.
K	File is to be written at 1600 bpi.
L	File is to be written at 800 bpi.
M	File is to be written at 556 bpi.
N	File is to be written at 200 bpi.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	File is on the Basic Disc.
ID=WD	File is on the Work Disc.
ID=0 ... F	File is on the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

.DTDFT

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
*OS * 54134 * FN=XXXXXXXXXXXXX NOT FOUND
*OS * 54135 * FN=XXXXXXXXXXXXX WRONG
```

.DTPFA Disc To Tape Program File Add

Function:

Adds an existing disc program file to the end of another program file existing on tape by writing the contents of the disc program file at the end of the tape program file making all appropriate adjustments in labels, tape marks, etc.

Order Card Format:

$$\text{.DTPFA}\quad\left[\text{, ID=}\left\{\begin{array}{c}\text{SD}\\\text{MD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\.\\.\\.\\\text{F}\end{array}\right\}\left[\text{, VN=vol no.}\right]\right]\text{, disc file name, OT=}\left\{\begin{array}{c}1\\.\\.\\.\\8\end{array}\right\}$$

$$\left[\text{, VN=vol no.}\right]\ ,\left\{\begin{array}{c}\text{P}\\\text{O}\end{array}\right\}\ ,\left\{\begin{array}{c}\text{K}\\\text{L}\\\text{M}\\\text{N}\end{array}\right\}$$

.DTPFA

Required Card Fields:

CONTENT	FORMAT OR INDICATION
disc file name	This field is a maximum of 12 alphanumeric characters.
OT=1 ... 8	Program file to be added to is on the unit whose select number is specified.
P	Odd parity is checked.
O	Even parity is checked.
K	Program file is written at 1600 bpi.
L	Program file is written at 800 bpi.
M	Program file is written at 556 bpi.
N	Program file is written at 200 bpi.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Program file to be added is on the Basic Disc.
ID=WD	Program file to be added is on the Work Disc.
ID=0 ... F	Program file to be added is on the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
* OS * 54134 * FN=XXXXXXXXXXXX NOT FOUND
* OS * 54135 * FN=XXXXXXXXXXXX WRONG
```

.DTPFT **Disc To Tape Program File Transfer**

Function:

Rewrites the program file existing on a specific disc, onto a specific tape reel, which contains no information before processing begins.

Order Card Format:

$$\text{.DTPFT}\ \left[\text{, ID=}\left\{\begin{bmatrix}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]\right]\text{, file name, OT=}\left\{\begin{bmatrix}1\\ \cdot\\ \cdot\\ \cdot\\ 8\end{bmatrix}\right\}$$

$$\left[\text{, VN=vol no.}\right]\ ,\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\}\ ,\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
file name	This field is a maximum of 12 alphanumeric characters.
OT=1 ... 8	Program file is to be written on the tape unit whose select number is specified.
P	Odd parity is checked.
O	Even parity is checked.
K	Program file is written at 1600 bpi.
L	Program file is written at 800 bpi.
M	Program file is written at 556 bpi.
N	Program file is written at 200 bpi.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Program file is on the Basic Disc.
ID=WD	Program file is on the Work Disc.
ID=0 ... F	Program file is on the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

.DTPFT

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
*OS  * 54134  * FN=XXXXXXXXXXXX NOT  FOUND
*OS  * 54135  * FN=XXXXXXXXXXXX WRONG
```

. FLPRT File Labels Print

Function:

Lists the labels of the program file, all data files, and the free space table from a specified disc.

Order Card Format:

$$.\text{FLPRT} \quad \left[,\text{ID}= \left\{ \begin{array}{l} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{array} \right\} \right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Labels listed are from the Basic Disc.
ID=WD	Labels listed are from the Work Disc.
ID=0 . . . F	Labels listed are from the unit whose select number is specified.

.FLPRT

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 50999 * END OF .FLPRT
```

. FOR Compile FORTRAN Program

Function:

Compiles a FORTRAN source program into machine language.

Order Card Format:

```
                          SD                                      SD
                          BD                                      BD
                          WD                                      WD
. FOR, pgm name  [ , ID= {  0  } [ , FN=file name ] ]  [ , OD= {  0  } ]
                          .                                       .
                          .                                       .
                          .                                       .
                          F                                       F

                     12
                     16
[ , OL ]  [ , MS= {  24  } ]  [ , OC=object periph ]  [ , OS=obj pgm adr ]
                     32

[ , PR=no. print pos ]
```

. FOR

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters long and may not contain embedded blanks.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Program to be compiled is on the Basic Disc.
ID=WD	Program to be compiled is on the Work Disc.
ID=0 ... F	Program to be compiled is on the unit whose select number is specified.
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters. The file name may contain embedded blanks or special characters, except the , and = characters.
OD=SD, BD	Object program is output on the Basic Disc.
OD=WD	Object program is output on the Work Disc.
OD=0 ... F	Object program is output on the unit whose select number is specified.
OL	Object program listing is to be output.
MS=12	12K is required for object program execution.

CONTENT	FORMAT OR INDICATION
MS=16	16K is required for object program execution.
MS=24	24K is required for object program execution.
MS=32	32K is required for object program execution.
OC=object periph	The object periph portion of this field is 1 to 3 characters long and may use the alphabetic characters T (magnetic tape), D (disc), or C (card punch).
OS=obj pgm adr	The obj pgm adr portion of this field is 4 or 5 numeric characters long and is coded in decimal.
PR=no. print pos	The no. print pos portion of this field is up to 3 numeric characters long and is coded in decimal.

Peripheral Devices Required:

This list does not include those devices that may be required for execution of the object program.

DEVICE	QUANTITY
Disc unit	1, 2, 3, or 4
Card reader	1
Printer	1

.FOR

Specific Condition Messages:

For a listing of these messages, see the appropriate FORTRAN Manual.

.FTU File Table Update

Function:

Updates the file table entry of a specific program residing on a disc unit.

Order Card Format:

```
                 ┌    ┐
                 │ SD │
                 │ MD │
                 │ BD │
                 │ LD │
                 │ WD │            ┌              ┐
.FTU  [,OD= {    │ 0  │  } ]   ,   {  TP= pgm name  }
                 │ .  │            │   pgm name   │
                 │ .  │            └              ┘
                 │ .  │
                 │ F  │
                 └    ┘
```

Required Card Fields:

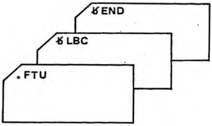
CONTENT	FORMAT OR INDICATION
TP=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.
pgm name	This field is a maximum of 8 alphanumeric characters.

.FTU

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, MD, BD, LD	Program entry is on the Basic Disc.
OD=WD	Program entry is on the Work Disc.
OD=0 ... F	Program entry is on the unit whose select number is specified.

Input Card Deck Example:



Detail Card Formats:

1. LBC (Label Control) Card
   This card provides the updating information for the program file table entry. If the optional card fields are coded, the respective portions of the entry are replaced as coded; if a field is not coded, the respective portion of the entry remains as it was before this order began processing:

```
b̸LBC  pgm name, file code  [, FN=file name]
      [, SF=ser file no.] [, DT=date] [, MU=unit no.]
                                            K
      [, AU=unit no.] [, CO=YNb̸ string] [, PK={ L }]
                                            M
                                            N
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.
file code	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.
SF=ser file no.	The ser file no. portion of this field is 6 alphanumeric characters long.
DT=date	The date portion of this field may be 5 characters long in the configuration YYDDD where YY is the last 2 digits of the year and DDD is the number of days from January 1 of that year.

The date portion of this field may also be one of 6 numeric characters, each interpreted as follows:

CHARACTER	INDICATES
0	Date to be used is that maintained by EDOS.
1	Date to be used is found in character positions 1 to 6 of the user area.
2	Date to be used is found in character positions 7 to 12 of the user area.
3	Date to be used is found in character positions 13 to 18 of the user area.
4	Date to be used is found in character positions 19 to 24 of the user area.
5	Date to be used is found in character positions 25 to 30 of the user area.

MU=unit no.	The unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
AU=unit no.	The unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.

CONTENT	FORMAT OR INDICATION
CO=YNb̸ string	Character string which provides several different options to the programmer. The YNb̸ string portion of this field is 6 alphanumeric characters long and each of the character positions may contain a Y or N character, or blank, depending on the options selected. The blank indicates that the existing contents of that position are to be retained. The choice in each character position has a yes/no effect on various operations as follows:

CHARACTER	OPERATION
1	Check file name
2	Check file serial number
3	Check volume sequence in multi-volume file
4	Check file creation date
5 (input files only)	Disable all file operations
6	Print header label

PK=K	Tape file recording density is 1600 bpi.
PK=L	Tape file recording density is 800 bpi.
PK=M	Tape file recording density is 556 bpi.
PK=N	Tape file recording density is 200 bpi.

2. END Card
This card is used to indicate that all the detail cards required by this order program have been read.

COLUMNS	CONTENTS
1 - 4	ȻEND
5 - 80	Not used

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 36100 * INVALID DETAIL CARD
* OS * 36134 * FN=XXXXXXXXXXXXX NOT FOUND
* OS * 36140 * DT=XXXXXX INVALID
* OS * 36147 * PN=XXXXXXXX INVALID
* OS * 36153 * PN=XXXXXXXX NOT FOUND
* OS * 36180 * FILE TABLE NOT FOUND
               ┌ MU ┐
* OS * 36181 * {    }= X WRONG
               └ AU ┘
* OS * 36182 * CO=XXXXXX WRONG
* OS * 36183 * PK INVALID
* OS * 36188 * AU NOT ACCEPTED
* OS * 36999 * END OF . FTU
```

.HLT Halt

Function:

Halts processing of the input card deck when this order card is encountered.

Order Card Format:

.HLT

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1

Specific Condition Messages:

No messages are output by the .HLT function.

.INT System Initialize

Function:

Loads the current date into the system, assigns units as the Work Disc and Work Tapes, checks their volume numbers, zeros condition maintenance areas and the check point counter, and loads information into the EDOS user area (0052 to 0083, decimal).

Order Card Format:

```
.INT, date [,WD=unit no.   [,VN=vol no.]]  [,W1=unit no.
     [,VN=vol no.]]  [,W2=unit no.   [,VN=vol no.]]
     [,W3=unit no.   [,VN=vol no.]]  [,UA=user data]
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
date	Date in the form YYDDD where YY is the last 2 digits of the year and DDD is the number of days from January 1 of that year.

.INT

Optional Card Fields:

CONTENT	INDICATES
WD=unit no.	The unit no. portion of this field is 1 character long.
W1=unit no.	The unit no. portion of this field is 1 character long.
W2=unit no.	The unit no. portion of this field is 1 character long.
W3=unit no.	The unit no. portion of this field is 1 character long.
VN=vol no.	The vol no. portion of this field is 6 alphanumeric characters long.
UA=user data	The user data portion of this field is a maximum of 32 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc units	1 or 2
Tape units	0 to 3
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 20151 * BD=WD WRONG
                W1         W1
*OS * 20152 * { W2 }  =  { W2 }     WRONG
                W3         W3
*OS * 20156 * TAPES NOT CONNECTED
*OS * 20208 * IMPOSSIBLE TO PROCEED/LOAD PILOT ZERO
*OS * 20800 * WD NOT INDICATED
                BD
*OS * 20801 * {    } =X FREE SPACE TABLE
                WD
*OS * 20802 * W1 NOT INDICATED
*OS * 20803 * W2 NOT INDICATED
*OS * 20804 * W3 NOT INDICATED
*OS * 20805 * W1 : TU=X
*OS * 20806 * W2 : TU=X
*OS * 20807 * W3 : TU=X
*OS * 20999 * END OF .INT
```

.LIST **File Program And Subroutine Labels List**

Function:

Lists the labels of programs and subroutines on the specified disc.

Order Card Format:

```
                  ┌SD┐
                  │MD│
                  │BD│
                  │LD│
.LIST   [, ID= {  │WD│  }]
                  │0 │
                  │. │
                  │. │
                  │. │
                  └F ┘
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Labels are listed from the Basic Disc.
ID=WD	Labels are listed from the Work Disc.
ID=0 . . . F	Labels are listed from the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 38125 * PROGRAM INDEX WRONG
* OS * 38127 * SUBROUTINE INDEX WRONG
* OS * 38999 * END OF .LIST
```

.LOAD Load Program

Function:

Loads a program residing in a program file on a specific disc unit into core store, initiates its execution, and updates its program file table entry.

Order Card Format:

$$.\mathrm{LOAD}\ \left[,\mathrm{ID}=\left\{\begin{bmatrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{LD}\\ \mathrm{WD}\\ 0\\ .\\ .\\ .\\ \mathrm{F}\end{bmatrix}\right.\right],\ \left\{\begin{bmatrix}\mathrm{TP{=}pgm\ name}\\ \mathrm{pgm\ name}\end{bmatrix}\right\}\ \left[,\mathrm{HT}=\left\{\begin{bmatrix}\mathrm{Y}\\ \mathrm{N}\end{bmatrix}\right\}\right]$$

$$\left[,\mathrm{FL}=\left\{\begin{bmatrix}\mathrm{Y}\\ \mathrm{N}\end{bmatrix}\right\}\right]\ \left[,\mathrm{UA{=}character\ string}\right]$$

Required Card Fields:

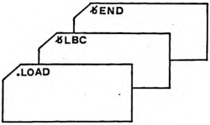
CONTENT	FORMAT OR INDICATION
TP=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program is on the Basic Disc.
ID=WD	Program is on the Work Disc.
ID=0 . . . F	Program is on the unit whose select number is specified.
HT=Y	A processing halt will occur before execution of the program begins.
HT=N	No processing halt will occur before execution of the program begins.
FL=Y	Store area not specifically reserved for use by EDOS will be loaded with 00001010 in each octet before the program is loaded for execution.
FL=N	No clearing of store occurs before the program is loaded for execution.
UA=character string	The character string portion of this field is a maximum of 32 alphanumeric characters.

Input Card Deck Example:



Detail Card Formats:

1. LBC (Label Control) Card
   This card provides the updating information for the program file table entry. If the optional card fields are coded, the respective portions of the entry are replaced as coded; if a field is not coded, the respective portion of the entry remains as it was before this order began processing.

   ƀLBC pgm name, file code [, FN=file name] [, SF=ser file no.]

   [, DT=date] [, MU=main unit no.] [, AU=alt unit no.]

   [, CO=YNƀ string] $\left[, \text{PK=} \left\{ \begin{bmatrix} \text{K} \\ \text{L} \\ \text{M} \\ \text{N} \end{bmatrix} \right\} \right]$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This name must be the same as that in the order card and is a maximum of 8 alphanumeric characters.
file code	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.
SF=ser file no.	The ser file no. portion of this field is 6 alphanumeric characters long.
DT=date	The date portion of this field may be 5 characters long in the configuration YYDDD (in decimal). The date portion of this field may also be one of 6 numeric characters, each interpreted as follows:

CHARACTER	INDICATES
0	Date to be used is that maintained by EDOS.
1	Date to be used is found in character positions 1 to 6 of the user area.

CHARACTER	INDICATES
2	Date to be used is found in character positions 7 to 12 of the user area.
3	Date to be used is found in character positions 13 to 18 of the user area.
4	Date to be used is found in character positions 19 to 24 of the user area.
5	Date to be used is found in character positions 25 to 30 of the user area.

MU=main unit no.	The main unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
AU=alt unit no.	The alt unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
CO=YNƀ string	Character string which provides several different options to the programmer. The YNƀ string portion of this field is 6 alphanumeric characters long and each of the character positions may contain a Y of N character, or blank, depending on the options selected. The blank indicates that the existing contents of that position are to be retained. The Y or N choice in each character position has a yes/no effect on various operations as follows:

CHARACTER	OPERATION
1	Check file name
2	Check file serial number
3	Check volume sequence in multi-volume file
4	Check file creation date
5 (input files only)	Disable all file operations
6	Print header label

PK=K	Tape file recording density is 1600 bpi.
PK=L	Tape file recording density is 800 bpi.
PK=M	Tape file recording density is 556 bpi.
PK=N	Tape file recording density is 200 bpi.

2. END Card
This card is used to indicate that all the detail cards required by this order program have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Not used

. LOAD

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 37100 * INVALID DETAIL CARD
* OS * 37134 * FC=XXXXXX NOT FOUND
* OS * 37140 * DT=XXXXX INVALID
* OS * 37147 * TP/PN=XXXXXXXX INVALID
* OS * 37180 * FILE TABLE NOT FOUND
* OS * 37181 * MU/AU=X WRONG
* OS * 37182 * CO=XXXXXX WRONG
* OS * 37183 * PK=X WRONG
* OS * 37184 * PROGRAM NOT LOADED
* OS * 37188 * AU NOT ACCEPTED
* OS * 37999 * END OF .LOAD
```

.LPP Library Program Punch

Function:

Punches a specific segment or segments of a program located in the program file on a specific disc unit.

Order Card Format:

$$.\text{LPP}\ \left[,\text{ID=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right],\text{pgm name}\quad \left[,\text{SG=seg no.}\right]\quad \left[,\text{punch code}\right]$$

$$\left[,\text{SS=start seg no.}\right]\quad \left[,\text{HX=}\left\{\begin{bmatrix}\text{Y}\\ \text{N}\end{bmatrix}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

.LPP

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program file is on the Basic Disc.
ID=WD	Program file is on the Work Disc.
ID=0 . . . F	Program file is on the unit whose select number is specified.
SG=seg no.	The seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
punch code	This field is 4 alphanumeric characters long.
SS=start seg no.	The start seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
HX=Y	Cards are punched in hexadecimal format.
HX=N	Cards are punched in the normal format.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card punch	1
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 30146 * SG=XX NOT FOUND
*OS * 30153 * PN=XXXXXXXX NOT FOUND
*OS * 30155 * PUNCH NOT CONNECTED
*OS * 30903 * PROGRAM LABEL : ...
*OS * 30999 * END OF .LPP
```

.LPPCK Library Program Punching Check

Function:

Compares the punched copy of an assembled program segment or segments or an entire assembled program with a copy of that same information stored in the program file.

Order Card Format:

$$\text{.LPPCK}\left[\text{, ID=}\left\{\left[\begin{array}{c}\text{SD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\.\\.\\.\\\text{F}\end{array}\right]\right\}\right]\text{, pgm name}\quad\left[\text{, SG=seg no.}\right]\left[\text{, punch code}\right]$$

$$\left[\text{, SS=start seg no.}\right]\quad\left[\text{, HX=}\left\{\begin{array}{c}\text{Y}\\\text{N}\end{array}\right\}\right]$$

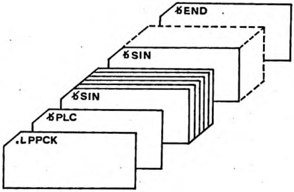
Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program file is on the Basic Disc.
ID=WD	Program file is on the Work Disc.
ID=0 ... F	Program file is on the unit whose select number is specified.
SG=seg no.	The seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
punch code	This field is 4 alphanumeric characters long.
SS=start seg no.	The start seg no. portion of this field is 2 numeric characters long and may be between 01 and 98.
HX=Y	Cards to be checked are punched in hexadecimal format.
HX=N	Cards to be checked are punched in the normal format.

Input Card Deck Example:



Detail Card Formats:

1. PLC (Program Label Control) Card
   This card must precede the object program deck being checked.

COLUMNS	CONTENTS
1 - 4	ƀPLC
5	1 or 3
6 - 13	Name of the program checked.
14	BIOS code.
15 - 23	Blank
24 - 27	Address (in hexadecimal) of the program file table.

COLUMNS	CONTENTS
28 - 31	Address (in hexadecimal) at which the program was loaded.
32 - 35	First available address (in hexadecimal) after the end of the program.
36 - 37	b̸b̸
38 - 42	Date in the form YYDDD (in decimal)
43	U for a utility program; b̸ for all other type programs.
44 - 47	Address (in hexadecimal) at which the program begins.
48 - 80	Blank

2. SIN (Segment Insert) Card
At least one of these cards must always appear; any additional are optional depending on whether the program being checked is divided into segments; a SIN card must be used preceding each segment.

COLUMNS	CONTENTS
1 - 4	b̸SIN
5	1 or 3
6 - 13	Name of the program checked.
14 - 19	Blank

COLUMNS	CONTENTS
20 - 21	Number (in decimal) of the segment checked.
22 - 32	Blank
33 - 36	Number (in decimal) of cards in the preceding program segment. If this is the first segment of a program or the only segment being checked, this field is left blank.
37	b̸
38 - 42	Date in the form YYDDD (in decimal).
43 - 80	Blank

3. END Card

This card is used to signal the fact that the entire deck to be processed by this order has been read.

COLUMNS	CONTENTS
1 - 4	b̸END
5 - 32	Blank
33 - 36	Number (in decimal) of cards in the last segment checked.
37 - 80	Blank

4. Object Program Information Card
The program to be checked must have its object information cards formatted as follows:

COLUMNS	CONTENTS
1 - 4	Object program punching code.
5 - 6	Number (in hexadecimal) of characters in the object information field.
7 - 10	Address (in hexadecimal) at which the object information was stored.
11 - 70	Object information.
71 - 74	Position number (in decimal) of this card in this segment.
75 - 78	Date in the form YDDD (in decimal).
79 - 80	Segment number.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.LPPCK

Specific Condition Messages:

```
* OS * 30146 * SG=XX NOT FOUND
* OS * 30153 * PN=XXXXXXXX NOT FOUND
* OS * 30158 * PUNCH ERROR ON **  CARD
* OS * 30903 * PROGRAM LABEL : ...
* OS * 30999 * END OF .LPPCK
```

.LSP Library Subroutine Punch

Function:

Punches a subroutine located in the subroutine library on a specific disc unit.

Order Card Format:

$$\text{.LSP} \quad \left[\text{, ID=}\left\{\begin{bmatrix} \text{SD}\\ \text{BD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right]\text{, subr name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

.LSP

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine is on the Basic Disc.
ID=0 ... F	Subroutine is on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Card punch	1
Printer	1

Specific Condition Messages:

```
* OS * 43126 * SUBROUTINE LIBRARY EMPTY
* OS * 43155 * PUNCH NOT CONNECTED
* OS * 43999 * END OF .LSP
```

.LSPCK Library Subroutine Punching Check

Function:

Compares the punched copy of a subroutine with a copy of the subroutine residing in a subroutine library.

Order Card Format:

$$\text{.LSPCK} \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{BD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \right] \text{, subr name}$$

Required Card Fields:

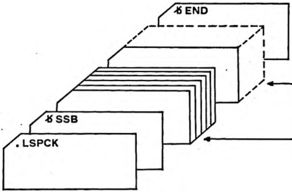
CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

.LSPCK

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine is on the Basic Disc.
ID=0 ... F	Subroutine is on the unit whose select number is specified.

Input Card Deck Example:



Page beginning card of subroutine's second page information and following page decks.

Page beginning card preceding subroutine's first page information.

Detail Card Formats:

1. SSB (Start Subroutine) Card
   This card must precede that deck containing the subroutine to be checked.

COLUMNS	CONTENTS
1 - 4	ɃSSB
5 - 6	Number (in hexadecimal) of characters in this card in columns 1-52.
7 - 12	Name of the subroutine.
13 - 16	Number (in unpacked binary) of characters in the subroutine.
17 - 52	Names of the subroutines which this subroutine may call. The subroutine names begin in columns 17, 23, 29, 35, 41, and 47.
53 - 62	Blank
63	N for a normal subroutine; D for a disc subroutine.
64 - 80	Blank

2. Page Beginning Card
This card precedes the information appearing on one disc page in store. The cards immediately following this card contain the information which is to appear on that one page.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of compilation in the form YYDDD (in decimal).

.LSPCK

COLUMNS	CONTENTS
13 - 16	0001
17 - 18	Number (in hexadecimal) of characters in this card in columns 1-69.
19 - 57	Names of the subroutines which this subroutine may call, each in a 7 character format. The first 6 of these characters are the name of the subroutine which may be called; the seventh character identifies the order in which the subroutines named are called.
58 - 61	Blank
62 - 65	Number (in decimal) of characters in this page of the subroutine.
66 - 69	Address (in hexadecimal) at which this page begins.
70 - 80	Blank

3. END Card
This is the last card in the deck. It indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

4. Object Program Card
This is the type card that actually contains the information as it appears in store.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of subroutine compilation in the form YYDDD (in decimal).
13 - 16	Position number (in decimal) of this card in the deck for this page. The card that follows the Page Beginning card must contain 0002 in these columns.
17 - 18	Number (in decimal) of characters in this card beginning in column 19.
19 - 80	Object program characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.LSPCK

Specific Condition Messages:

```
*OS * 43126 * SUBROUTINE LIBRARY EMPTY
*OS * 43158 * PUNCH ERROR ON ** CARD
*OS * 43999 * END OF .LSPCK
```

.MDG Master Disc Generate

Function:

Assigns a disc unit as the Master Disc and specifies on that disc the order in which EDOS and user programs must be executed.

Order Card Format:

$$\text{.MDG} \left[\text{, ID=} \begin{bmatrix} \text{SD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{bmatrix} \left[\text{, VN=vol no.} \right] \right] , \begin{bmatrix} \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{bmatrix} \left[\text{, VN=vol no.} \right]$$

Required Card Fields:

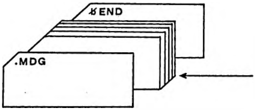
CONTENT	FORMAT OR INDICATION
WD	Work Disc will be used as the Master Disc.
0 . . . F	Disc unit whose select number is specified will be used as the Master Disc.

. MDG

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program information will come from the Basic Disc.
ID=WD	Program information will come from the Work Disc.
ID=0 . . . F	Program information will come from the unit whose select number is specified. The number of a Master Disc may not be coded.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Input Card Deck Example:



OPC and UPC card deck. An LBC card must appear after each UPC card in the deck.

The OPC and UPC cards are arranged in the input deck in the same relative positions or order in which the programs they represent are to be executed unless some other order is specified by options selected in the cards themselves.

Detail Card Formats:

1. OPC (Operating System Program Copy) Card

OPC Card Format:

$\not{b}$OPC pgm name $\left[\text{, pgm name...}\right]$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name...	This field may extend to the last column in the card; each program name may be a maximum of 8 alphanumeric characters; and a comma must separate any two program names.

2. UPC (User Program Copy) Card
Each UPC card must be followed by an LBC card.

UPC Card Format:

```
b̸UPC pgm name  [, HT=Y]  [, FL=N]  [, UA=character string]
            ┌ 1, pgm name             ┐
            │ 2, pgm name, pgm name   │
          , { 3                       }
            │ 4                       │
            │ 5                       │
            └ 6                       ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.
1, pgm name	The pgm name field is a maximum of 8 alphanumeric characters.
2, pgm name, pgm name	Each program name following the concatenation code is a maximum of 8 alphanumeric characters and the names must be separated by a comma.
3	The next order card in the input deck is read after execution of the program whose name begins in column 5.
4	A Master Disc Stop order is executed after execution of the program whose name begins in column 5.

CONTENT	FORMAT OR INDICATION
5	The program named at locations 134 to 141 will be executed after execution of the program whose name begins in column 5.
6	The program whose name begins in column 5 determines how execution is to continue and which program is executed next.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
HT=Y	Processing halts for manual intervention before this order is executed.
FL=N	Store is not cleared before the program is loaded for execution.
UA=character string	The character string portion of this field is a maximum of 32 alphanumeric characters.

3. LBC (Label Control) Card

This card is used to update the label of the program whose UPC card precedes this card. Each UPC card in the input deck must be followed by an LBC card.

b̸LBC Card Format:

```
b̸LBC pgm name, file code [, FN=file name] [, SF=ser file no.]
    [, DT=date] [, MU=main unit no.] [, AU=alt unit no.]
                                    ┌K┐
                                    │L│
    [, CO=YNb̸ string] [, PK=      {  M  } ]
                                    └N┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This name must be the same as that in the UPC card and is a maximum of 8 alphanumeric characters.
file code	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.
SF=ser file no.	The ser file no. portion of this field is 6 alphanumeric characters long.
DT=date	The date portion of this field may be 5 characters long in the form YYDDD or one of 6 numeric characters, 0 through 5.

CONTENT	FORMAT OR INDICATION
MU=main unit no.	The main unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 to 8 for tape units.
AU=alt unit no.	The alt unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
CO=YNb̸ string	The YNb̸ string portion of this field is 6 alphanumeric characters long and each of the character positions may contain a Y, N, or b̸ character, depending on the options selected. The b̸ character indicates that the previous contents of this character position in the label are to be retained. Character position 1 must always be b̸ in the case of disc files. The choice in each character position has the following effect:

CHARACTER	INDICATES
1	Y-check file name N-don't check file name
2	Y-check file serial number N-don't check file serial number
3	Y-check volume sequence in multi-volume file N-don't check volume sequence in multi-volume file

CHARACTER	INDICATES
4	Y-check file creation date N-don't check file creation date
5 (input files only)	Y-disable all file operations N- permit all file operations
6	Y-print header label N-don't print header label

PK=K	Tape file recording density is 1600 bpi.
PK=L	Tape file recording density is 800 bpi.
PK=M	Tape file recording density is 556 bpi.
PK=N	Tape file recording density is 200 bpi.

4. END Card

This card indicates that all the cards to be processed by this order program have been read.

END Card Format:

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Not used.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2 or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 41122 * DU=X : PROGRAM FILE NOT AVAILABLE
*OS * 41123 * PROGRAM INDEX OVERFLOW
*OS * 41999 * END OF .MDG
```

.MDP Memory Dump

Function:

Lists the portion of store specified in the order card at the printer.

Order Card Format:

.MDP [, limit adr]

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
limit adr	This field is 8 characters long; each 4 character portion contains 1 address in hexadecimal.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 03102 * ADDRESS FIELD WRONG
* OS * 03904 * MEMORY DUMP OF PROGRAM XXXXXXXX
* OS * 03999 * END OF .MDP
```

.MDS Master Disc Stop

Function:

Halts execution of the program string on the Master Disc.

Order Card Format:

```
.MDS
```

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 05195 * MASTER DISC STOP
```

.MONITOR Monitor Load

Function:

Loads a program from the Master Disc into store, initiates its execution, updates the program label on the Master Disc, and loads information into the user area (0052 to 0083, decimal).

Order Card Format:

$$\text{.MONITOR, pgm name} \left[\text{, HT=}\begin{Bmatrix}\text{Y}\\\text{N}\end{Bmatrix}\right]\left[\text{, FL=}\begin{Bmatrix}\text{Y}\\\text{N}\end{Bmatrix}\right]$$

$$\left[\text{, UA=character string}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

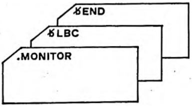
Optional Card Fields:

CONTENT	FORMAT OR INDICATION
HT=Y	A halt will occur before the program is loaded and executed.

. MONITOR

CONTENT	FORMAT OR INDICATION
HT=N	No halt occurs before the program is loaded and executed.
FL=Y	Store is cleared to 00001010 in each octet from the end of BIOS before the program is loaded and executed.
FL=N	Store is not cleared before the program is loaded and executed.
UA=character string	The character string portion of this field is a maximum of 32 alphanumeric characters.

Input Card Deck Example:



Detail Card Formats:

1. LBC (Label Control) Card

   The format of the LBC card is something like that of an order card since the location of an optional field in the punched card depends on the other optional fields that have been selected rather than a specific card column. This card is used to update the program label on the Master Disc. If no change in the label is required, the LBC card and END card need not be used.

b̸LBC Card Format:

$$\text{b̸LBC pgm name, file code } \left[\text{, FN=file name}\right] \left[\text{, SF=ser file no.}\right]$$

$$\left[\text{, DT=date}\right] \left[\text{, MU=unit no.}\right] \left[\text{, AU=unit no.}\right] \left[\text{, CO=YNb̸ string}\right]$$

$$\left[\text{, PK=} \left\{ \begin{bmatrix} \text{K} \\ \text{L} \\ \text{M} \\ \text{N} \end{bmatrix} \right\} \right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This name must be the same as that in the order card and is a maximum of 8 alphanumeric characters.
file code	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.

CONTENT	FORMAT OR INDICATION
SF=ser file no.	The ser file no. portion of this field is 6 alphanumeric characters long.
DT=date	The date portion of this field may be 5 characters long in the configuration YYDDD where YY is the last 2 digits of the year and DDD is the number of days from January 1 of that year. The date portion of this field may also be one of 6 numeric characters, each interpreted as follows:

CHARACTER	INDICATES
0	Date maintained by EDOS.
1	Date is found in character positions 1 to 6 of the user area.
2	Date is found in character positions 7 to 12 of the user area.
3	Date is found in character positions 13 to 18 of the user area.
4	Date is found in character positions 19 to 24 of the user area.
5	Date is found in character positions 25 to 30 of the user area.

CONTENT	FORMAT OR INDICATION
MU=unit no.	The unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
AU=unit no.	The unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
CO=YNb̸ string	Character string which provides several different options to the programmer. The YNb̸ string portion of this field is 6 alphanumeric characters long and each of the character positions may contain a Y or N character, or blank, depending on the options selected. The blank indicates that the existing contents of that position are to be retained. The choice in each character position has a yes/no effect on various operations as follows:

CHARACTER	OPERATION
1	Check file name
2	Check file serial number

3	Check volume sequence in multi-volume file
4	Check file creation date
5 (input files only)	Disable all file operations
6	Print header label

CONTENT	FORMAT OR INDICATION
PK=K	Indicates 1600 bpi.
PK=L	Indicates 800 bpi.
PK=M	Indicates 556 bpi.
PK=N	Indicates 200 bpi.

2. END Card

This card is used to indicate that all the detail cards required by this order program have been read. If no ƀLBC card is used, the END card need not be used.

END Card Format:

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Not used.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS  * 05100  * INVALID DETAIL CARD
*OS  * 05147  * PN=XXXXXXXX INVALID
*OS  * 05191  * END OF PROGRAM XXXXXXXX
*OS  * 05192  * NEXT PROGRAM IS XXXXXXXX
*OS  * 05193  * NEXT PROGRAM IS XXXXXXXX WITH SWITCH 2 OFF
                                YYYYYYYY WITH SWITCH 2 ON
*OS  * 05194  * NEXT PROGRAM SELECTED BY ORDER CARD
*OS  * 05196  * NEXT PROGRAM XXXXXXXX SELECTED BY ENDED
                                          PROGRAM
*OS  * 05197  * CHAIN SELECTED BY ENDED PROGRAM
*OS  * 05999  * END OF . MONITOR
```

.PFCL Program File Close

Function:

Closes a program file from a specified point in the file.

Order Card Format:

$$\text{.PFCL}\ \left[\text{,OD=}\left\{\begin{bmatrix}\text{SD}\\\text{MD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\\cdot\\\cdot\\\cdot\\\text{F}\end{bmatrix}\right\}\right]\ ,\ \left\{\begin{bmatrix}\text{TP= pgm name}\\\text{pgm name}\end{bmatrix}\right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
TP=pgm name	The pgm name portion of this field is 8 alphanumeric characters long.
pgm name	This field is 8 alphanumeric characters long.

.PFCL

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, MD, BD, LD	File is on the Basic Disc.
OD=WD	File is on the Work Disc.
OD=0 . . . F	File is on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 35902 * OD=X : HDR1 . . .
* OS * 35999 * END OF .PFCL
```

.PFCP Program File Copy

Function:

Copies a program file existing on one disc onto another disc unit.

Order Card Format:

$$.\text{PFCP}\ \left[,\text{ID}=\left\{\begin{matrix}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{matrix}\right\}\right],\ \left\{\begin{matrix}\text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{matrix}\right\}\ \left[,\text{VN=vol no.}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
WD	File is copied onto the Work Disc.
0 . . . F	File is copied on the unit whose select number is specified.

.PFCP

Optional Card Fields:

CONTENTS	FORMAT OR INDICATION
ID=SD, MD, BD, LD	File to be copied is on the Basic Disc.
ID=WD	File to be copied is on the Work Disc.
ID=0 ... F	File to be copied is on the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2 or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 34120 * PROGRAM FILE OVERFLOW
*OS * 34122 * DU=X : PROGRAM FILE NOT AVAILABLE
*OS * 34164 * PF LABEL NOT AVAILABLE
*OS * 34202 * PF LABEL NOT FOUND
*OS * 34211 * PF LABEL WRONG
*OS * 34902 * OD=X : HDR1 ...
*OS * 34999 * END OF .PFCP
```

.PFD Program File Define

Function:

Creates a program file label on a specific volume.

Order Card Format:

$$\text{.PFD,}\left\{\begin{array}{l}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ \text{0}\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{array}\right\}\text{, vol no., pgm file name,}\left\{\begin{array}{l}\text{M= first cyl/no. cyls}\\ \text{ME=no. cyls}\end{array}\right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	Label is written on the Basic Disc.
WD	Label is written on the Work Disc.
0 . . . F	Label is written on the unit whose select number is specified.

.PFD

CONTENT	FORMAT OR INDICATION
vol no.	This field is a maximum of 6 alphanumeric characters.
pgm file name	This field is a maximum of 12 alphanumeric characters.
M=first cyl/ no. cyls	The length of the first cyl/no. cyls portion of this field is 6 alphanumeric characters; 3 characters for each value.
ME=no. cyls	The no. cyls portion of this field is 3 numeric characters long.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 49109 * ORDER CARD INCOMPLETE
* OS * 49130 * SPACE TABLE OVERFLOW
* OS * 49132 * SPACE NOT AVAILABLE
* OS * 49135 * FN=XXXXXXXXXXXX WRONG
* OS * 49139 * NEW EXTENSION TOO SMALL
* OS * 49141 * IF=XXXXXX NOT ACCEPTED
* OS * 49159 * NEW EXTENSION TOO LARGE
* OS * 49165 * PF LABEL NOT EMPTY
* OS * 49166 * FILE SPACE NOT ACCEPTED
* OS * 49808 * .PFD NOT EXECUTED
* OS * 49999 * END OF .PFD
```

.PFDL   Program File Delete

Function:

Eliminates the program file from a specific disc unit.

Order Card Format:

```
         ┌ SD ┐
         │ MD │
         │ BD │
         │ LD │
         │ WD │
.PFDL,  {  0   }    , vol no. pgm file name
         │ .  │
         │ .  │
         │ .  │
         └ F  ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	File is on the Basic Disc.
WD	File is on the Work Disc.
0 . . . F	File is on the unit whose select number is specified.

CONTENT	FORMAT OR INDICATION
vol no.	This field is a maximum of 6 alphanumeric characters.
pgm file name	This field is a maximum of 12 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 49109 * ORDER CARD INCOMPLETE
* OS * 49130 * SPACE TABLE OVERFLOW
* OS * 49135 * FN=XXXXXXXXXXXX WRONG
* OS * 49141 * IF=XXXXXX NOT ACCEPTED
* OS * 49808 * .PFDL NOT EXECUTED
* OS * 49999 * END OF .PFDL
```

.PFU Program File Label Update

Function:

Updates a program file label on a specific volume by replacing certain fields in that label.

Order Card Format:

```
         ┌SD ┐
         │MD │
         │BD │
         │LD │
         │WD │                                   ┌     ┌DD  ┐ ┐
.PFU,   <│0  │>  ,vol no., pgm file name         │,DT={│date│}│
         │.  │                                   └     └    ┘ ┘
         │.  │
         │.  │
         └F  ┘

     [,ME=no. cyls]  [,FN=pgm file name]
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	Label is on the Basic Disc.
WD	Label is on the Work Disc.

CONTENT	FORMAT OR INDICATION
0 ... F	Label is on the unit whose select number is specified.
vol no.	This field is a maximum of 6 alphanumeric characters.
pgm file name	This field is a maximum of 12 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
DT=DD	This form indicates that the date maintained by EDOS is to be used for replacement.
DT=date	The date portion of this field is 5 numeric characters long in the form YYDDD, in decimal.
ME=no. cyls	The no. cyls portion of this field is 3 numeric characters long.
FN=pgm file name	The pgm file name portion of this field is a maximum of 12 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 49109 * ORDER CARD INCOMPLETE
*OS * 49130 * SPACE TABLE OVERFLOW
*OS * 49132 * SPACE NOT AVAILABLE
*OS * 49135 * FN=XXXXXXXXXXXX WRONG
*OS * 49139 * NEW EXTENSION TOO SMALL
*OS * 49141 * IF=XXXXXX NOT ACCEPTED
*OS * 49159 * NEW EXTENSION TOO LARGE
*OS * 49166 * FILE SPACE NOT ACCEPTED
*OS * 49808 * .PFU NOT EXECUTED
*OS * 49999 * END OF .PFU
```

.PLPK Program Library Pack

Function:

Compacts a program file removing free spaces from the interior of the file by rewriting the file on the same or another disc unit.

Order Card Format:

```
                   ┌    ┐
                   │ SD │
                   │ BD │
                   │ LD │
                   │ WD │
.PLPK  [ ,OD=     {  0  } ]   [ ,VN=vol no. ]
                   │ .  │
                   │ .  │
                   │ .  │
                   │ F  │
                   └    ┘
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD, LD	File is packed and rewritten on the Basic Disc.
OD=WD	File is packed and rewritten on the Work Disc.
OD=0 . . . F	File is packed and rewritten on the unit whose select number is specified.

.PLPK

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 33121 * PROGRAM FILE EMPTY
*OS * 33125 * PROGRAM INDEX WRONG
*OS * 33999 * END OF .PLPK
```

.PLPRT Program Library Print

Function:

Lists the program library from a specific program or the entire program library at the printer.

Order Card Format:

$$\text{.PLPRT} \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{bmatrix} \right\} \right] \left[\text{,} \left\{ \begin{bmatrix} \text{pgm name} \\ \text{TP=pgm name} \end{bmatrix} \right\} \right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Program library is on the Basic Disc.
ID=WD	Program library is on the Work Disc.
ID=0 . . . F	Program library is on the unit whose select number is specified.

.PLPRT

CONTENT	FORMAT OR INDICATION
pgm name	This field is 8 alphanumeric characters long.
TP=pgm name	The pgm name portion of this field is 8 alphanumeric characters long.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 33121 * PROGRAM FILE EMPTY
*OS * 33125 * PROGRAM INDEX WRONG
*OS * 33999 * END OF .PLPRT
```

.PLTR Program Library Transfer

Function:

Transfers the program file from one disc unit to another disc unit.

Order Card Format:

$$\text{.PLTR}\ \left[\text{, ID=}\left\{\begin{array}{c}\text{SD}\\\text{BD}\\\text{LD}\\0\\.\\.\\.\\\text{F}\end{array}\right\}\right]\ ,\ \left\{\begin{array}{c}\text{SD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\.\\.\\.\\\text{F}\end{array}\right\}\ \left[\text{, VN=vol no.}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, BD, LD	Program file is transferred to the Basic Disc.
WD	Program file is transferred to the Work Disc.
0 . . . F	Program file is transferred to the unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program file is transferred from the Basic Disc.
ID=0 . . . F	Program file is transferred from the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 33120 * PROGRAM FILE OVERFLOW
* OS * 33121 * PROGRAM FILE EMPTY
* OS * 33125 * PROGRAM INDEX WRONG
* OS * 33999 * END OF .PLTR
```

.PLU Program Label Update

Function:

Modifies a specific part or parts of a program label such as the program name and/or date by replacing those fields.

Order Card Format:

$$.\mathrm{PLU}\ \left[,\mathrm{OD}=\left\{\begin{matrix}\mathrm{SD}\\ \mathrm{MD}\\ \mathrm{BD}\\ \mathrm{LD}\\ \mathrm{WD}\\ 0\\ .\\ .\\ .\\ \mathrm{F}\end{matrix}\right\}\right],\mathrm{pgm\ name}\ \left[,\mathrm{PN}=\mathrm{pgm\ name}\right]\ \left[,\mathrm{DT}=\left\{\begin{bmatrix}\mathrm{DD}\\ \mathrm{date}\end{bmatrix}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

.PLU

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, MD, BD, LD	Label is on the Basic Disc.
OD=WD	Label is on the Work Disc.
OD=0 . . . F	Label is on the unit whose select number is specified.
PN=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.
DT=DD	This form indicates that the date maintained by EDOS is to be used for replacement.
DT=date	The date portion of this field is 5 numeric characters long in the form YYDDD.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS *  31041 *  PN=XXXXXXXX NOT AVAILABLE
*OS *  31043 *  PROGRAM INDEX WRONG
*OS *  31109 *  ORDER CARD INCOMPLETE
*OS *  31900 *  OD=X : HDR1 ...
*OS *  31999 *  END OF .PLU
```

.PPI Punched Program Insert

Function:

Inserts a program residing in a card deck into a program file.

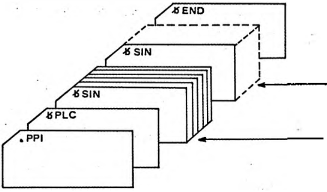
Order Card Format:

$$.PPI \quad \left[,OD= \left\{ \begin{bmatrix} SD \\ MD \\ BD \\ LD \\ WD \\ 0 \\ . \\ . \\ . \\ F \end{bmatrix} \right\} \right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, MD, BD, LD	File is on the Basic Disc.
OD=WD	File is on the Work Disc.
OD=0 . . . F	File is on the unit whose select number is specified.

Input Card Deck Example:



SIN card preceding the second program segment and each following segment's information cards.

SIN card preceding first program segment.

Detail Card Formats:

1. PLC (Program Label Create) Card
   This card must always follow the order card.

COLUMNS	CONTENTS
1 - 4	ƀPLC
5	1 or 3
6 - 13	Program name
14	BIOS code (4, 5, 6, or 7)
15 - 23	Blank
24 - 27	Address (in hexadecimal) of the program file table.

COLUMNS	CONTENTS
28 - 31	Address (in hexadecimal) at which the program is to be loaded.
32 - 35	First available address (in hexadecimal) after the end of the program.
36 - 37	b̸b̸
38 - 42	Date in the form YYDDD (in decimal).
43	U for a utility program; b̸ for all other programs.
44 - 47	Address (in hexadecimal) at which the executable instructions of the program begins.
48 - 80	Blank

2. SIN (Segment Insert) Card
This card must precede each segment in the program to be inserted. If the program is not segmented, one of these cards must precede the first card of the program. It must follow the PLC card.

COLUMNS	CONTENTS
1 - 4	b̸SIN
5	1 or 3
6 - 13	Program name
14 - 19	Blank

COLUMNS	CONTENTS
20 - 21	Segment number (in decimal).
22 - 32	Blank
33 - 36	Number (in decimal) of cards in the preceding segment. If this is the only segment or the first segment of a program, this field may be left blank.
37	ƀ
38 - 42	Date in the form YYDDD (in decimal).
43 - 80	Blank

3. END Card
This card must always be the last card of the input deck and indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 32	Blank
33 - 36	Number (in decimal) of cards in the preceding segment inserted.
37 - 80	Blank

4. Program Information Card:
The cards containing the program to be inserted must contain information in the following format:

.PPI

COLUMNS	CONTENTS
1 - 4	Object program punching code.
5 - 6	Number (in hexadecimal) of characters in the object information field.
7 - 10	Store address (in hexadecimal) of the first character in this card.
11 - 70	Program information.
71 - 74	Position number (in decimal) of this card in this segment.
75 - 78	Date in the form YDDD (in decimal).
79 - 80	Number (in decimal) of the segment.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 31043 * PROGRAM INDEX WRONG
* OS * 31100 * INVALID DETAIL CARD
* OS * 31102 * ADDRESS FIELD WRONG
* OS * 31103 * INVALID CARD DATA
* OS * 31104 * CARD DATA LENGTH WRONG
* OS * 31106 * CARD SEQUENCE ERROR
* OS * 31107 * CARD CODE WRONG
* OS * 31120 * PROGRAM FILE OVERFLOW
* OS * 31121 * PF LABEL EMPTY
* OS * 31123 * PROGRAM INDEX OVERFLOW
* OS *31140 * DT=XXXXXX INVALID
* OS *31145 * SG=XX WRONG
* OS *31147 * PN=XXXXXXXX INVALID
* OS *31164 * PF LABEL NOT AVAILABLE
* OS *31902 * OD=X : HDR1 ...
* OS *31999 * END OF .PPI
```

.PPRT Program Print

Function:

Lists a specific program or segment of a program at the printer.

Order Card Format:

$$.\text{PPRT} \left[,\text{ID}= \left\{ \begin{bmatrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{bmatrix} \right\} \right] , \left\{ \begin{bmatrix} \text{pgm name} \\ \text{TP=pgm name} \end{bmatrix} \right\} \left[,\text{SG=seg no.} \right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is 8 alphanumeric characters long.
TP=pgm name	The pgm name portion of this field is 8 alphanumeric characters long.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Program is on the Basic Disc.
ID=WD	Program is on the Work Disc.
ID=0 ... F	Program is on the unit whose select number is specified.
SG=seg no.	The seg no. portion of this field is two numeric characters long and may be between 00 and 99.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 39121 * PROGRAM FILE EMPTY
* OS * 39999 * END OF .PPRT
```

.PSI Punched Subroutine Insert

Function:

Writes one or more subroutines residing in a card deck in the subroutine library.

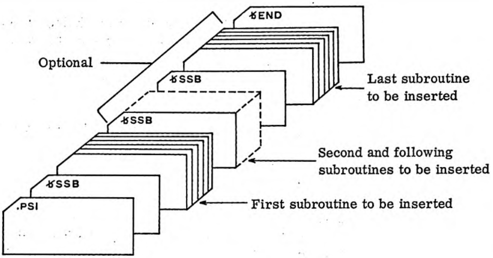
Order Card Format:

$$.PSI \left[,OD= \left\{ \begin{bmatrix} SD \\ BD \\ 0 \\ . \\ . \\ . \\ F \end{bmatrix} \right\} \right] \left[,LR=no.\ cyls \right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD	Library is on the Basic Disc.
OD=0 . . . F	Library is on the unit whose select number is specified.
LR=no. cyls	The no. cyls portion of this field is 3 numeric characters long and is coded in decimal.

Input Card Deck Example:


b̸END
Optional
b̸SSB
Last subroutine to be inserted
b̸SSB
Second and following subroutines to be inserted
b̸SSB
.PSI
First subroutine to be inserted

Detail Card Formats:

1. SSB (Start Subroutine) Card
   This card must precede the card deck of each subroutine to be inserted.

COLUMNS	CONTENTS
1 - 4	b̸SSB
5 - 6	Number (in hexadecimal) of characters in this card in columns 1 - 52.
7 - 12	Name of the subroutine.

.PSI

COLUMNS	CONTENTS
13 - 16	Number (in unpacked binary) of characters in the subroutine.
17 - 52	Names of the subroutines which this subroutine may call. The subroutine names begin in columns 17,23, 29, 35, 41, and 47.
53 - 62	Blank
63	N for a normal subroutine; D for a disc subroutine.
64 - 80	Blank

2. Page Beginning Card
This card identifies the beginning of a page in store. All the information following this card, until the next page beginning card is encountered, will be written on one page in store.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of compilation in the form YYDDD (in decimal).
13 - 16	0001
17 - 18	Number (in hexadecimal) of characters in this card in columns 1- 69.

COLUMNS	CONTENTS
19 - 57	Names of the subroutines which this subroutine may call, each in a 7 character format. The first 6 of these characters are the name of the subroutine which may be called; the seventh character identifies the order in which the subroutines named are called.
58 - 61	Blank
62 - 65	Number (in decimal) of characters in this page of the subroutine.
66 - 69	Address (in hexadecimal) at which this page begins.
70 - 80	Blank

3. Object Program Card
This type card contains the actual text of the program.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of compilation in the form YYDDD (in decimal).
13 - 16	Number (in decimal) of this card in the portion of the input deck intended for this page. The card following the page beginning card should be numbered 0002.
17 - 18	Number (in hexadecimal) of characters in this card.

. PSI

COLUMNS	CONTENTS
19 - 80	Object program data.

4. END Card

This card indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 44100 * INVALID DETAIL CARD
*OS * 44104 * CARD DATA LENGTH WRONG
*OS * 44106 * CARD SEQUENCE ERROR
*OS * 44123 * PROGRAM FILE OVERFLOW
*OS * 44127 * SUBROUTINE INDEX WRONG
*OS * 44137 * PAGE LENGTH WRONG
```

```
* OS * 44138 * PAGE ADDRESS WRONG
* OS * 44161 * SR=XXXXXX NOT FOUND
* OS * 44162 * SR=XXXXXX INVALID NAME
* OS * 44902 * OD=X : HDR1 ...
* OS * 44999 * END OF .PSI
```

.PSTR Program Strip

Function:

Deletes one or more programs from the program file.

Order Card Format:

$$\text{.PSTR}\ \left[,\text{OD=}\left\{\begin{bmatrix}\text{SD}\\\text{BD}\\\text{LD}\\0\\.\\.\\.\\\text{F}\end{bmatrix}\right\}\right],\left\{\begin{bmatrix}\text{TP= pgm name}\\\text{pgm name}\end{bmatrix}\right\}\ \left[,\left\{\begin{bmatrix}\text{TP= pgm name}\\\text{pgm name}\end{bmatrix}\right\}\right]\ldots$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
TP=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.
pgm name	Name of the program to be deleted. This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD, LD	Program file is on the Basic Disc.
OD=0 . . . F	Program file is on the unit whose select number is specified.
TP=pgm name	The pgm name portion of each entry is a maximum of 8 alphanumeric characters. This field may not extend past column 72 and a comma must separate any two entries.
pgm name	Each name is a maximum of 8 alphanumeric characters. This field may not extend past column 72 and a comma must separate any two entries.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.PSTR

Specific Condition Messages:

```
* OS * 32121 * PROGRAM FILE EMPTY
* OS * 32124 * PROGRAM INDEX NOT AVAILABLE
* OS * 32125 * PROGRAM INDEX WRONG
* OS * 32128 * PN/TP=XXXXXXXX NOT AVAILABLE
* OS * 32147 * PN/TP=XXXXXXXX INVALID
* OS * 32153 * PN/TP=XXXXXXXX NOT FOUND
* OS * 32164 * PF LABEL NOT AVAILABLE
* OS * 32999 * END OF .PSTR
```

.PSTWS Program Strip Without Shift

Function:

Deletes one or more programs from the program file without compacting the file.

Order Card Format:

$$\text{.PSTWS}\left[\text{,OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{LD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right],\left[\begin{Bmatrix}\text{TP= pgm name}\\ \text{pgm name}\end{Bmatrix}\right]\left[,\left[\begin{Bmatrix}\text{TP= pgm name}\\ \text{pgm name}\end{Bmatrix}\right]\right]\ldots$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
TP=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.
pgm name	This field is a maximum of 8 alphanumeric characters.

.PSTWS

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD, LD	Program file is on the Basic Disc.
OD=0 . . . F	Program file is on the unit whose select number is specified.
TP=pgm name	The pgm name portion of each entry is a maximum of 8 alphanumeric characters. This field may not extend past column 72 and a comma must separate any two entries.
pgm name	Each name is a maximum of 8 alphanumeric characters. This field may not extend past column 72 and a comma must separate any two entries.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condtition Messages:

```
* OS * 32121 * PROGRAM FILE EMPTY
* OS * 32124 * PROGRAM INDEX NOT AVAILABLE
* OS * 32125 * PROGRAM INDEX WRONG
* OS * 32128 * PN/TP=XXXXXXXX NOT AVAILABLE
* OS * 32147 * PN/TP=XXXXXXXX INVALID
* OS * 32153 * PN/TP=XXXXXXXX NOT FOUND
* OS * 32164 * PF LABEL NOT AVAILABLE
* OS * 32999 * END OF .PSTWS
```

.PTR Program Transfer

Function:

Transfers one or more programs from the program file of one disc unit to the program file of another.

Order Card Format:

$$.\mathrm{PTR}\ \left[,\mathrm{ID}=\left\{\begin{bmatrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{LD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \mathrm{F}\end{bmatrix}\right\}\right]\ ,\ \left\{\begin{bmatrix}\mathrm{SD}\\ \mathrm{BD}\\ \mathrm{LD}\\ \mathrm{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \mathrm{F}\end{bmatrix}\right\}\ \left[,\mathrm{VN{=}vol\ no.}\right]\ ,\mathrm{pgm\ name}$$

$$\left[,\mathrm{pgm\ name}\ldots\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, BD, LD	Program is transferred to the Basic Disc.
WD	Program is transferred to the Work Disc.

CONTENT	FORMAT OR INDICATION
0 ... F	Program is transferred to the unit whose select number is specified.
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program is transferred from the Basic Disc.
ID=0 ... F	Program is transferred from the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.
pgm name...	Each program name is a maximum of 8 alphanumeric characters and a comma must separate any 2 names. Column 72 is the last that may be used for names in this field.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

. PTR

Specific Condition Messages:

```
*OS * 33120 * PROGRAM FILE OVERFLOW
*OS * 33121 * PROGRAM FILE EMPTY
*OS * 33125 * PROGRAM INDEX WRONG
*OS * 33999 * END OF .PTR
```

.PUC Program Update By Cards

Function:

Updates information present in a program which resides in a program file and, if necessary, shifts programs to maintain the file in its most compact form.

Order Card Format:

$$\text{.PUC} \quad \left[\text{,OD=} \left\{ \begin{bmatrix} \text{SD} \\ \text{MD} \\ \text{BD} \\ \text{LD} \\ \text{WD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \right]$$

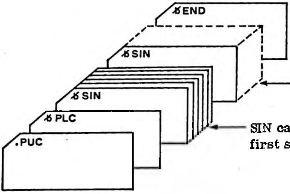
Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, MD, BD, LD	Program is on the Basic Disc.
OD=WD	Program is on the Work Disc.

.PUC

CONTENT	FORMAT OR INDICATION
OD=0 . . . F	Program is on the unit whose select number is specified.

Input Card Deck Example:



SIN card preceding the second program segment and each following segment's updating cards.

SIN card preceding deck of first segment updating cards.

Detail Card Formats:

1. PLC (Program Label Create) Card
   This card must always follow the order card.

COLUMNS	CONTENTS
1 - 4	ƀPLC
5	1 or 3
6 - 13	Program name

COLUMNS	CONTENTS
14	BIOS code (4, 5, 6, or 7)
15 - 23	Blank
24 - 27	Address (in hexadecimal) of the program file table.
28 - 31	Address (in hexadecimal) at which the program is to be loaded.
32 - 35	First available address (in hexadecimal) after the end of the program.
36 - 37	b̸b̸
38 - 42	Date in the form YYDDD (in decimal).
43	U for a utility program; b̸ for all other type programs.
44 - 47	Address (in hexadecimal) at which the executable instructions of the program begin.
48 - 80	Blank

2. SIN (Segment Insert) Card
This card must precede each segment's updating information. If the program is not segmented, one of these cards must precede the first card of the program. It must follow the PLC card.

COLUMNS	CONTENTS
1 - 4	ƀSIN
5	1 or 3
6 - 13	Program name
14 - 19	Blank
20 - 21	Segment number (in decimal)
22 - 32	Blank
33 - 36	Number (in decimal) of cards in the preceding segment. If this is the only segment or the first segment of a program, this field may be left blank.
37	ƀ
38 - 42	Date in the form YYDDD (in decimal).
43 - 80	Blank

3. END Card

This card must always be the last card of the input deck and indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 32	Blank

COLUMNS	CONTENTS
33 - 36	Number (in decimal) of cards in the preceding segment.
37 - 80	Blank

4. Information Updating Card:
The cards containing updating information appear in the following format.

COLUMNS	CONTENTS
1 - 4	Object program punching code.
5 - 6	Number (in hexadecimal) of characters in the object information field.
7 - 10	Store address (in hexadecimal) of information in this card.
11 - 70	Program information.
71 - 74	Position number (in decimal) of this card in this segment.
75 - 78	Date in the form YDDD (in decimal).
79 - 80	Number (in decimal) of the segment.

.PUC

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS *  31040 *  PN=XXXXXXXX NOT FOUND
* OS *  31041 *  PN=XXXXXXXX NOT AVAILABLE
* OS *  31043 *  PROGRAM INDEX WRONG
* OS *  31100 *  INVALID DETAIL CARD
* OS *  31102 *  ADDRESS FIELD WRONG
* OS *  31103 *  INVALID CARD DATA
* OS *  31104 *  CARD DATA LENGTH WRONG
* OS *  31105 *  CARD COUNT WRONG
* OS *  31106 *  CARD SEQUENCE ERROR
* OS *  31107 *  CARD CODE WRONG
* OS *  31120 *  PROGRAM FILE OVERFLOW
* OS *  31121 *  PF LABEL EMPTY
* OS *  31123 *  PROGRAM INDEX OVERFLOW
* OS *  31124 *  PROGRAM INDEX NOT AVAILABLE
* OS *  31125 *  PROGRAM INDEX  WRONG
* OS *  31128 *  PN=XXXXXXXX NOT AVAILABLE
* OS *  31140 *  DT=XXXXXX INVALID
* OS *  31145 *  SG=XX WRONG
* OS *  31147 *  PN=XXXXXXXX INVALID
* OS *  31164 *  PF LABEL NOT AVAILABLE
* OS *  31902 *  OD=X : HDR1 . . .
* OS *  31999 *  END OF . PUC
```

.PUCWS Program Update By Cards Without Shift

Function:

Updates information present in a program which resides in a program file without compacting the file.

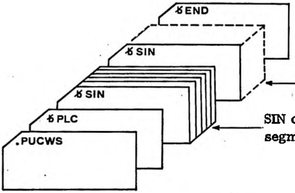
Order Card Format:

```
                  ┌      ┐
                  │ SD   │
                  │ MD   │
                  │ BD   │
                  │ LD   │
.PUCWS  [ ,OD=   {│ WD   │}  ]
                  │ 0    │
                  │ .    │
                  │ .    │
                  │ .    │
                  │ F    │
                  └      ┘
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, MD,BD, LD	Program is on the Basic Disc.
OD=WD	Program is on the Work Disc.
OD=0 . . . F	Program is on the unit whose select number is specified.

Input Card Deck Example:



SIN card preceding the second program segment and each following segment's updating cards.

SIN card preceding deck of first segment updating cards.

Detail Card Formats:

1. PLC (Program Label Create) Card
   This card must always follow the order card.

COLUMNS	CONTENTS
1 - 4	ƀPLC
5	Program type code (1 or 3).
6 - 13	Program name
14	BIOS code (4, 5, 6, or 7)
15 - 23	Blank
24 - 27	Address (in hexadecimal) of the program file table.
28 - 31	Address (in hexadecimal) at which the program is to be loaded.

COLUMNS	CONTENTS
32 - 35	First available address (in hexadecimal) after the end of the program.
36 - 37	b̸b̸
38 - 42	Date in the form YYDDD (in decimal).
43	U for a utility program; b̸ for all other type programs.
44 - 47	Address (in hexadecimal) at which the executable instructions of the program begin.
48 - 80	Blank

2. SIN (Segment Insert) Card
This card must precede each segment's updating information. If the program is not segmented, one of these cards must precede the first card of the program. It must follow the PLC card.

COLUMNS	CONTENTS
1 - 4	b̸SIN
5	Program type code (1 or 3).
6 - 13	Program name
14 - 19	Blank
20 - 21	Segment number (in decimal).
22 - 32	Blank

COLUMNS	CONTENTS
33 - 36	Number (in decimal) of cards in the preceding segment. If this is the only segment or the first segment of a program, this field may be left blank.
37	ƀ
38 - 42	Date in the form YYDDD (in decimal).
43 - 80	Blank

3. END Card
This card must always be the last card of the input deck and indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 32	Blank
33 - 36	Number (in decimal) of cards in the preceding segment.
37 - 80	Blank

4. Information Updating Card
The cards containing updating information appear in the following format.

COLUMNS	CONTENTS
1 - 4	Object program punching code.
5 - 6	Number (in hexadecimal) of characters in the object information field.
7 - 10	Store address (in hexadecimal) of information in this card.
11 - 70	Program information.
71 - 74	Position number (in decimal) of this card in this segment.
75 - 78	Date in the form YDDD (in decimal).
79 - 80	Number (in decimal) of the segment.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

.PUCWS

Specific Condition Messages:

```
* OS *  31040 *  PN=XXXXXXXX NOT FOUND
* OS *  31041 *  PN=XXXXXXXX NOT AVAILABLE
* OS *  31043 *  PROGRAM INDEX WRONG
* OS *  31100 *  INVALID DETAIL CARD
* OS *  31101 *  DETAIL CARD OVERFLOW
* OS *  31102 *  ADDRESS FIELD WRONG
* OS *  31103 *  INVALID CARD DATA
* OS *  31104 *  CARD DATA LENGTH WRONG
* OS *  31105 *  CARD COUNT WRONG
* OS *  31106 *  CARD SEQUENCE ERROR
* OS *  31107 *  CARD CODE WRONG
* OS *  31120 *  PROGRAM FILE OVERFLOW
* OS *  31121 *  PF LABEL EMPTY
* OS *  31123 *  PROGRAM INDEX OVERFLOW
* OS *  31124 *  PROGRAM INDEX NOT AVAILABLE
* OS *  31125 *  PROGRAM INDEX WRONG
* OS *  31140 *  DT=XXXXXX INVALID
* OS *  31145 *  SG=XX WRONG
* OS *  31147 *  PN=XXXXXXXX INVALID
* OS *  31164 *  PF LABEL NOT AVAILABLE
* OS *  31902 *  OD=X : HDR1 ...
* OS *  31999 *  END OF .PUCWS
```

.RFD Random File Define

Function:

Prepares a file label for a random file.

Order Card Format:

$$\text{.RFD,}\left\{\begin{bmatrix}\text{SD}\\\text{MD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\.\\.\\.\\\text{F}\end{bmatrix}\right\}\text{, vol no., file name,}\left\{\begin{bmatrix}6\\8\end{bmatrix}\right\}\text{, ser file no., ord no.,}$$

$$\left\{\begin{bmatrix}\text{F}\\\text{V}\end{bmatrix}\right\}\left[\text{,RP=retent per}\right]\text{ ,}\left\{\begin{bmatrix}\text{M=first cyl/no. cyls}\\\text{ME=}\left\{\begin{bmatrix}\text{no. cyls}\\\text{RE}\end{bmatrix}\right\}\end{bmatrix}\right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	File is on the Basic Disc.

.PFD

CONTENT	FORMAT OR INDICATION
WD	File is on the Work Disc.
0 . . . F	File is on the unit whose select number is specified.
vol no.	This field is a maximum of 6 alphanumeric characters.
file name	This field is a maximum of 12 alphanumeric characters.
6	File is written in 6-bit mode.
8	File is written in 8-bit mode.
ser file no.	This field is a maximum of 6 alphanumeric characters.
ord no.	This field is a maximum of 2 numeric characters.
F	File ends on the volume on which the file label is being written.
V	File for which the label is being written is continued on another volume.
M=first cyl/ no. cyls	The length of the first cyl/no. cyls portion of this field is 6 numeric characters; 3 characters for each value.
ME=no. cyls	The no. cyls portion of this field is three numeric characters.

CONTENT	FORMAT OR INDICATION
ME=RE	Whatever number of cylinders is required will be assigned to the file.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
RP=retent per	The retent per portion of this field is a maximum of 3 numeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 47109 * ORDER CARD INCOMPLETE
* OS * 47130 * SPACE TABLE OVERFLOW
* OS * 47132 * SPACE NOT AVAILABLE
* OS * 47135 * FN=XXXXXXXXXXXXX WRONG
* OS * 47141 * IF=XXXXXX NOT ACCEPTED
* OS * 47159 * NEW EXTENSION TOO LARGE
* OS * 47999 * END OF .RFD
```

.RFU Random File Label Update

Function:

Updates a random file label by replacing specific fields in that label.

Order Card Format:

$$\text{.RFU,}\left\{\begin{matrix}\text{SD}\\\text{MD}\\\text{BD}\\\text{LD}\\\text{WD}\\0\\\cdot\\\cdot\\\cdot\\\text{F}\end{matrix}\right\}\text{, vol no., file name}\quad\left[\text{, SF=ser file no.}\right]$$

$$\left[\text{, ON=ord no.}\right]\quad\left[\text{, ET=}\left\{\begin{matrix}\text{F}\\\text{V}\end{matrix}\right\}\right]\quad\left[\text{, DT=}\left\{\begin{matrix}\text{DD}\\\text{date}\end{matrix}\right\}\right]$$

$$\left[\text{, RP=retent per}\right]\quad\left[\text{, FN=file name}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	Label is on the Basic Disc.

CONTENT	FORMAT OR INDICATION
WD	Label is on the Work Disc.
0 ... F	Label is on the unit whose select number is specified.
vol no.	This field is a maximum of 6 alphanumeric characters.
file name	This field is a maximum of 12 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
SF=ser file no.	The ser file no. portion of this field is a maximum of 6 alphanumeric characters.
ON=ord no.	The ord no. portion of this field is a maximum of 2 numeric characters.
ET=F	This form indicates that the file ends on this volume.
ET=V	This form indicates that the file is continued on another volume.
DT=DD	This form indicates that the date maintained by EDOS is to be used for replacement.
DT=date	The date portion of this field is 5 numeric characters long in the form YYDDD (in decimal).

.RFU

CONTENT	FORMAT OR INDICATION
RP=retent per	The retent per portion of this field is a maximum of 3 numeric characters.
FN=file name	This field is a maximum of 12 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 47109 * ORDER CARD INCOMPLETE
* OS * 47130 * SPACE TABLE OVERFLOW
* OS * 47132 * SPACE NOT AVAILABLE
* OS * 47135 * FN=XXXXXXXXXXXX WRONG
* OS * 47141 * IF=XXXXXX NOT ACCEPTED
* OS * 47159 * NEW EXTENSION TOO LARGE
* OS * 47999 * END OF .RFD
```

.RPG Report Program Generate

Function:

Loads the RPG Compiler and passes required information to it regarding the program to be generated.

Order Card Format:

COLUMNS	FORMAT OR INDICATION
1 - 4	.RPG
5 - 9	Blank
10	P, C, M, or ƀ.
11 - 12	Blank
13 - 14	ƀƀ, or 00 to 16.
15 - 16	Blank
17	1, 2, or ƀ.
18	1, 2, or ƀ.
19	0, 1, 2, or ƀ.
20	0, 1, 2, or ƀ.

COLUMNS	FORMAT OR INDICATION
21	I or ƀ.
22 - 25	Blank
26	T or ƀ.
27 - 31	Address (in decimal) of the start of the user program or blank.
32 - 33	Blank
34	B or ƀ.
35 - 36	00 to 4F provides the number of a punch connector, when applicable.
37	7 indicates that Work Tape 1 is 7 track; blank indicates that Work Tape 1 is 9 track.
38	7 indicates that Work Tape 2 is 7 track; blank indicates that Work Tape 2 is 9 track.
39	L or ƀ.
40 - 45	Name of a user-coded print subroutine or blank.
46 - 72	Blank
73 - 80	Program name or blank.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

For a listing of these messages, refer to the appropriate RPG manual.

.SFD Sequential File Define

Function:

Prepares a file label for a sequential file.

Order Card Format:

$$\text{.SFD,}\left\{\begin{bmatrix}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\text{, vol no., file name,}\left\{\begin{bmatrix}6\\ 8\end{bmatrix}\right\}\text{, ser file no., ord no.,}$$

$$\left\{\begin{bmatrix}\text{F}\\ \text{V}\end{bmatrix}\right\}\left[\text{,RP=retent per}\right]\text{,}\left\{\begin{bmatrix}\text{M=first cyl/no. cyls}\\ \text{ME=}\left\{\begin{bmatrix}\text{no. cyl}\\ \text{RE}\end{bmatrix}\right\}\end{bmatrix}\right\}$$

$$\left[\left\{\begin{bmatrix}\text{,O=first cyl/no. cyls}\\ \text{,OE=no. cyls}\end{bmatrix}\right\}\right]\quad\left[\left\{\begin{bmatrix}\text{,I=ind cyl}\\ \text{,IC}\end{bmatrix}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	File for which the label is to be prepared resides on the Basic Disc.
WD	File for which the label is to be prepared resides on the Work Disc.
0 ... F	File for which the label is to be prepared resides on the disc unit whose select number is specified.
vol no.	This field is a maximum of 6 alphanumeric characters.
file name	This field is a maximum of 12 alphanumeric characters.
6	File for which the label is being prepared is written in 6-bit mode.
8	File for which the label is being prepared is written in 8-bit mode.
ser file no.	This field is a maximum of 6 alphanumeric characters.
ord no.	This field is a maximum of 2 numeric characters.
F	File for which the label is being prepared ends on the volume which will contain the label. An end-of-file mark is written.

CONTENT	FORMAT OR INDICATION
V	File for which the label is being prepared will continue on a volume other than the one on which the label which is being prepared will be written. An end-of-volume mark is written.
M=first cyl/ no. cyls	The length of the first cyl/ no. cyls portion of this field is 6 numeric characters. Each portion of the field is 3 numeric characters long and is coded in decimal with leading zeros, if required.
ME=no. cyls	The no. cyls portion of this field is 3 numeric characters long and is coded in decimal with leading zeros, if required.
ME=RE	This form indicates that in processing, whatever number of cylinders is required (if available on the disc unit specified) will be assigned to the file.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
RP=retent per	The retent per portion of this field is a maximum of 3 numeric characters.
O=first cyl/no. cyls	The length of the first cyl/no. cyls portion of this field is 3 numeric characters and is coded in decimal with leading zeros, if required.
OE=no. cyls	The no. cyls portion of this field is 3 numeric characters long and is coded in decimal with leading zeros, if required.

CONTENT	FORMAT OR INDICATION
I=ind cyl	The ind cyl portion of this field is 3 numeric characters long and is coded in decimal with leading zeros, if required.
IC	Indicates that the cylinder to be asseigned as the index cylinder of the file for which the label is being prepared is to be selected by EDOS.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 47109 * ORDER CARD INCOMPLETE
*OS * 47130 * SPACE TABLE OVERFLOW
*OS * 47132 * SPACE NOT AVAILABLE
*OS * 47135 * FN=XXXXXXXXXXXX WRONG
*OS * 47141 * IF=XXXXXX NOT ACCEPTED
*OS * 47159 * NEW EXTENSION TOO LARGE
*OS * 47999 * END OF .SFD
```

.SFU Sequential File Label Update

Function:

Updates a sequential file label by replacing specific fields in that label.

Order Card Format:

$$.\text{SFU},\left\{\begin{array}{l}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{array}\right\}\text{, vol no., file name }\left[\text{, SF=ser file no.}\right]\left[\text{,ON=ord no.}\right]$$

$$\left[\text{, ET=}\left\{\begin{array}{c}\text{F}\\ \text{V}\end{array}\right\}\right]\left[\text{, DT=}\left\{\begin{array}{c}\text{DD}\\ \text{date}\end{array}\right\}\right]\left[\text{, RP=retent per}\right]\left[\text{, ME=}\left\{\begin{array}{c}\text{no. cyls}\\ \text{RE}\end{array}\right\}\right]$$

$$\left[,\left\{\begin{array}{l}\text{O=first cyl/no. cyls}\\ \text{OE=no. cyls}\end{array}\right\}\right]\left[,\left\{\begin{array}{l}\text{I=ind cyl}\\ \text{IC}\end{array}\right\}\right]\left[\text{, FN=file name}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	File whose label is being updated resides on the Basic Disc.
WD	File whose label is being updated resides on the Work Disc.
0 ... F	File whose label is being updated resides on the disc unit whose select number is specified.
vol no.	This field is a maximum of 6 alphanumeric characters.
file name	This field is a maximum of 12 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
SF=ser file no.	The ser file no. portion of this field is a maximum of 6 alphanumeric characters.
ON=ord no.	The ord no. portion of this field is a maximum of 2 numeric characters.
ET=F	File for which the label is being updated ends on the volume which will contain the updated label. An end-of-file mark is written.

CONTENT	FORMAT OR INDICATION
ET=V	File for which the label is being updated ends on a volume other than the one which will contain the updated label. An end-of-volume mark is written.
DT=DD	This form indicates that the date maintained by EDOS is to be used for replacement.
DT=date	The date portion of this field is 5 numeric characters long and is coded in the form YYDDD (in decimal).
RP=retent per	The retent per portion of this field is a maximum of 3 numeric characters.
ME=no. cyls	The no. cyls portion of this field is 3 numeric characters long and is coded in decimal with leading zeros, if required.
ME=RE	This form indicates that whatever number of cylinders is required (if available on the disc unit specified) will be assigned to the file.
O=first cyl/ no. cyls	The length of the first cyl/no. cyls portion of this field is 6 numeric characters and each portion is coded in decimal with leading zeros, if required.
OE=no. cyls	The no. cyls portion of this field is 3 numeric characters long and is coded in decimal with leading zeros, if required.

CONTENT	FORMAT OR INDICATION
I=ind cyl	The ind cyl portion of this field is 3 numeric characters long and is coded in decimal with leading zeros, if required.
IC	Indicates that the cylinder to be assigned as the index cylinder of the file for which the label is being updated is to be selected by EDOS. This field replaces the respective one in the label being updated.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 47109 * ORDER CARD INCOMPLETE
* OS * 47130 * SPACE TABLE OVERFLOW
* OS * 47132 * SPACE NOT AVAILABLE
* OS * 47135 * FN=XXXXXXXXXXXXX WRONG
* OS * 47141 * IF=XXXXXX NOT ACCEPTED
* OS * 47159 * NEW EXTENSION TOO LARGE
* OS * 47999 * END OF .SFU
```

.SGE Samples Generate

Function:

Prepares sample information from detail card input writing the information, in blocks, on tape. Tape marks are also written as requested.

Order Card Format:

$$\text{.SGE,}\left\{\begin{bmatrix}\text{W1}\\ \text{W2}\\ \text{W3}\\ 1\\ \cdot\\ \cdot\\ \cdot\\ 8\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]\text{ ,}\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\}\text{,}\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right.\text{ ,}\left\{\begin{bmatrix}\text{AN}\\ \text{HX}\end{bmatrix}\right.$$

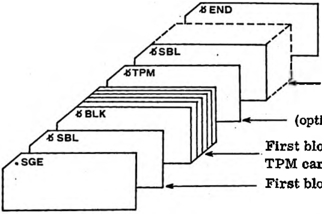
$$\left[\text{, ET=}\left\{\begin{bmatrix}\text{F}\\ \text{V}\end{bmatrix}\right\}\right]\left[\text{, BS=no. blocks}\right]\quad\left[\text{, NB=}\left\{\begin{bmatrix}\text{Y}\\ \text{N}\end{bmatrix}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
W1, W2, W3	Samples are written on Work Tape 1, 2, or 3.
1 ... 8	Samples are written on the tape unit whose select number is specified.

CONTENT	FORMAT OR INDICATION
P	Odd parity is checked during writing.
O	Even parity is checked during writing.
K	Samples are written at 1600 bpi.
L	Samples are written at 800 bpi.
M	Samples are written at 556 bpi.
N	Samples are written at 200 bpi.
AN	Samples are written in alphanumeric form.
HX	Samples are written in hexadecimal form.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.
ET=F	Samples form a file which ends on this volume. An end-of-file mark is written.
ET=V	Samples form a file which is continued on another volume. An end-of-volume mark is written.
BS=no. blocks	The no. blocks portion of this field is a maximum of 4 numeric characters, is coded in decimal, and may be from 1 to 9999.
NB=Y	Blocks written are to be numbered.
NB=N	Blocks written are not to be numbered.

Input Card Deck Example:



Second block's start block card followed by that and other block decks

(optional) tape mark card

First block's information and TPM cards

First block's start block card

Detail Card Formats:

1. SBL (Start Block) Card
This card is used to indicate that all cards following, until the next SBL or END card is encountered, provide information to be written in one block.

COLUMNS	CONTENTS
1 - 4	ƀSBL
5 - 80	Blank

2. BLK (Block) Card

This type card contains the information that is to be written in the block. As many block cards as required can be used.

COLUMNS	CONTENTS
1 - 4	␢BLK
5 - 6	Number (in decimal) of characters in this card beginning in column 7.
7 - 80	Information to appear in the block being written.

3. TPM (Tape Mark) Card

This type card causes a tape mark to be written whenever it is encountered in the input card deck.

COLUMNS	CONTENTS
1 - 4	␢TPM
5 - 80	Blank

4. END Card

This card indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	␢END
5 - 80	Blank

.SGE

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
*OS  * 59100*  INVALID DETAIL CARD
*OS  * 59103*  INVALID CARD DATA
*OS  * 59104*  CARD DATA LENGTH WRONG
*OS  * 59142*  DF=OP NOT ACCEPTED
*OS  * 59198*  BLOCK LENGTH WRONG
*OS  * 59999*  END OF .SGE
```

.SLCL Subroutine Library Close

Function:

Closes the subroutine library after a specific subroutine shifting the program file to occupy the free space provided by the closing.

Order Card Format:

$$\text{.SLCL} \quad \left[\text{,OD=} \left\{ \begin{bmatrix} \text{SD} \\ \text{BD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \right] \text{, subr name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is 6 alphanumeric characters long.

.SLCL

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD	Library is on the Basic Disc.
OD=0 . . . F	Library is on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 61161 * SR=XXXXXX NOT FOUND
*OS * 61902 * OD=X : HDR1 ...
*OS * 61999 * END OF .SLCL
```

.SLCWS Subroutine Library Close Without Shift

Function:

Closes the subroutine library after a specific subroutine without shifting the program file to occupy the free space provided by the closing.

Order Card Format:

$$\text{.SLCWS} \left[\text{,OD=} \left\{ \begin{bmatrix} \text{SD} \\ \text{BD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \right] \text{, subr name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is 6 alphanumeric characters long.

.SLCWS

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD	Library is on the Basic Disc.
OD=0 . . . F	Library is on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 61161 * SR=XXXXXX NOT FOUND
*OS * 61902 * OD=X : HDR1 ...
*OS * 61999 * END OF .SLCWS
```

.SLDL Subroutine Library Delete

- Function:

Deletes the subroutine library from a System Disc shifting the location of the program file to optimize the use of store.

Order Card Format:

$$\text{.SLDL}\quad \left[\text{, OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD	Library is on the Basic Disc.
OD=0 ... F	Library is on the unit whose select number is specified.

.SLDL

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS *  45902  * OD=X : HDR1 . . .
* OS *  45999  * END OF .SLDL
```

.SLDWS Subroutine Library Delete Without Shift

Function:

Deletes all the subroutines present in a subroutine library without shifting program file information to optimize the amount of store used.

Order Card Format:

```
                    ┌    ┐
                    │ SD │
                    │ BD │
                    │ 0  │
.SLDWS   [,OD=     {│ .  │}   ]
                    │ .  │
                    │ .  │
                    │ F  │
                    └    ┘
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD	Subroutine library is on the Basic Disc.
OD=0 . . . F	Subroutine library is on the unit whose select number is specified

.SLDWS

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 45902 * OD=X : HDR1 ...
*OS * 45999 * END OF .SLDWS
```

.SLP Subroutine Library Punch

Function:

Punches the entire subroutine library from a specified disc unit.

Order Card Format:

$$\text{.SLP} \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{BD} \\ 0 \\ \cdot \\ \cdot \\ \cdot \\ \text{F} \end{bmatrix} \right\} \right]$$

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Library is on the Basic Disc.
ID=0 ... F	Library is on the unit whose select number is specified.

.SLP

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Card punch	1
Printer	1

Specific Condition Messages:

```
*OS * 43126 * SUBROUTINE LIBRARY EMPTY
*OS * 43155 * PUNCH NOT CONNECTED
*OS * 43999 * END OF .SLP
```

.SLPCK Subroutine Library Punching Check

Function:

Compares the punched copy of the subroutine library with a copy of the library located on a System Disc.

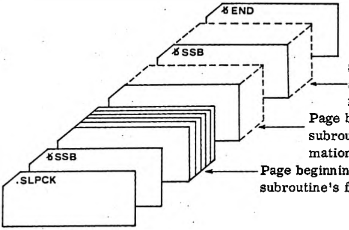
Order Card Format:

```
                    ┌    ┐
                    │ SD │
                    │ BD │
                    │ 0  │
.SLPCK  [ ,ID=  {   │ .  │  } ]
                    │ .  │
                    │ .  │
                    │ F  │
                    └    ┘
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Library is on the Basic Disc.
ID=0 ... F	Library is on the unit whose select number is specified.

Input Card Deck Example:



SSB card preceding second subroutine and following page decks.

Page beginning card of first subroutine's second page information and following page decks.

Page beginning card preceding first subroutine's first page information.

Detail Card Formats:

1. SSB (Start Subroutine) Card
   This card must precede each subroutine in the deck.

COLUMNS	CONTENTS
1 - 4	ƀSSB
5 - 6	Number (in hexadecimal) of characters in this card in columns 1-52.
7 - 12	Name of the subroutine.
13 - 16	Number (in unpacked binary) of characters in the subroutine.

COLUMNS	CONTENTS
17 - 52	Names of the subroutines which this subroutine may call. The subroutine names begin in columns 17, 23, 29, 35, 41, and 47.
53 - 62	Blank
63	N for a normal subroutine; D for a disc subroutine.
64 - 80	Blank

2. Page Beginning Card
This card precedes the information appearing on one disc page in store. The cards immediately following this card contain the information which is to appear on that one page.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of compilation in the form YYDDD (in decimal).
13 - 16	0001
17 - 18	Number (in hexadecimal) of characters in this card in columns 1-69.
19 - 57	Names of the subroutines which this subroutine may call, each in a 7 character format. The first 6 of these characters are the name of the subroutine which may be called; the seventh character identifies the order in which the subroutines named are called.

COLUMNS	CONTENTS
58 - 61	Blank
62 - 65	Number (in decimal) of characters in this page of the subroutine.
66 - 69	Address (in hexadecimal) at which this page begins.
70 - 80	Blank

3. END Card
This is the last card in the deck. It indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

4. Object Program Card
This is the type card that actually contains the information as it appears in store.

COLUMNS	CONTENTS
1 - 6	Name of the subroutine.
7	Blank
8 - 12	Date of subroutine compilation in the form YYDDD (in decimal).

COLUMNS	CONTENTS
13 - 16	Position number (in decimal) of this card in the deck for this page. The card that follows the Page Beginning Card must contain 0002 in these columns.
17 - 18	Number (in decimal) of characters in this card beginning in column 19.
19 - 80	Object program characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 43126 * SUBROUTINE LIBRARY EMPTY
* OS * 43158 * PUNCH ERROR ON **  CARD
* OS * 43999 * END OF .SLPCK
```

.SLPRT Subroutine Library Print

Function:

Lists the subroutine library either from a specified subroutine or the entire library at the printer.

Order Card Format:

```
                 ┌    ┐
                 │ SD │
                 │ BD │
                 │ 0  │
.SLPRT  [ ,ID= { │ .  │ } ]  [ ,subr name ]
                 │ .  │
                 │ .  │
                 │ F  │
                 └    ┘
```

Optional Card Fields:

CONTENTS	FORMAT OR INDICATION
ID=SD, BD	Library is on the Basic Disc.
ID=0 . . . F	Library is on the unit whose select number is specified.
subr name	This field is 6 alphanumeric characters long.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS *  46126 *  SUBROUTINE LIBRARY EMPTY
* OS *  46999 *  END OF .SLPRT
```

.SLTR Subroutine Library Transfer

Function:

Transfers the entire subroutine library from one disc unit to another disc unit.

Order Card Format:

```
                   ┌SD┐       ┌SD┐
                   │BD│       │BD│
                   │0 │       │WD│
.SLTR  [, ID=  <   │. │ > ] , <│0 │>  [, VN=vol no.]
                   │. │       │. │
                   │. │       │. │
                   └F ┘       │. │
                              └F ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, BD	Library is transferred to the Basic Disc.
WD	Library is transferred to the Work Disc.
0 . . . F	Library is transferred to the unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Library is transferred from the Basic Disc.
ID=0 ... F	Library is transferred from the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2 or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 62123 * PROGRAM FILE OVERFLOW
* OS * 62161 * SR=XXXXXX NOT FOUND
* OS * 62902 * OD=X : HDR1 ...
* OS * 62999 * END OF .SLTR
```

.SPG Sort Program Generate

Function:

Compiles a sort/merge program from input information stored on disc or in a card deck.

Order Card Format:

$$\text{.SPG, pgm name, OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{bmatrix}\right\}\left[\text{, MS}\quad\left[\text{, AS}\right]\ \left[\text{, RM=}\left\{\begin{bmatrix}6\\ 8\end{bmatrix}\right\}\right]\right]$$

$$\left[\text{, CM=character string}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.
OD=SD	Compiled program is stored on the Basic Disc.
OD=WD	Compiled program is stored on the Work Disc.

CONTENT	FORMAT OR INDICATION
OD=0 ... F	Compiled program is stored on the disc unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
MS	Indicates the SPG macrostatements are on disc rather than on cards.
AS	Indicates that auxiliary statements follow the SPG macrostatements on disc.
RM=6	Information for program generation is stored in 6-bit mode.
RM=8	Information for program generation is stored in 8-bit mode.
CM=character string	The character string portion of this field is a maximum of 35 alphanumeric characters.

Peripheral Devices Required:

This list does not include those devices that may be required by SPG or in execution of the program generated.

.SPG

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

Specific Condition Messages:

For a listing of these messages, refer to the appropriate SPG manual.

.SPRT Subroutine Print

Function:

Lists a specified subroutine at the printer.

Order Card Format:

$$\text{.SPRT} \left[\text{, ID=} \left\{ \begin{bmatrix} \text{SD} \\ \text{BD} \\ 0 \\ . \\ . \\ . \\ \text{F} \end{bmatrix} \right\} \right] \text{, subr name}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is 6 alphanumeric characters long.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine is on the Basic Disc.

.SPRT

CONTENT	FORMAT OR INDICATION
ID=0 ... F	Subroutine is on the disc whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 46126 * SUBROUTINE LIBRARY EMPTY
*OS * 46999 * END OF .SPRT
```

.SRC Subroutine Compile

Function:

Assembles a subroutine other than an EIOS disc subroutine coded in APS into machine language.

Order Card Format:

$$\text{.SRC, subr name} \left[\text{,ID=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\right] \left[\text{,OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\right] \left[\text{,NL}\right]$$

$$\left[\text{, CM=character string}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is 6 alphanumeric characters long.

.SRC

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine to be assembled is on the Basic Disc.
ID=WD	Subroutine to be assembled is on the Work Disc.
ID=0 ... F	Subroutine to be assembled is on the unit whose select number is specified.
OD=SD, BD	Object subroutine is output on the Basic Disc.
OD=WD	Object subroutine is output on the Work Disc.
OD=0 ... F	Object subroutine is output on the unit whose select number is specified.
NL	No object program listing is to be output during assembly.
CM=character string	The character string portion of this field is a maximum of 30 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1, 2, or 3
Card reader	1
Printer	1

Specific Condition Messages:

For a listing of these messages refer to the appropriate APS manual.

.SSTR Subroutine Strip

Function:

Deletes one or more subroutines from the subroutine library on a System Disc.

Order Card Format:

$$\text{.SSTR}\quad\left[\text{,OD=}\left\{\begin{matrix}\text{SD}\\ \text{BD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{matrix}\right\}\right]\text{, subr name}\quad\left[\text{, subr name}\ldots\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
OD=SD, BD	Library is on the Basic Disc.
OD=0 ... F	Library is on the unit whose select number is specified.
subr name...	Each subroutine name is a maximum of 6 alphanumeric characters and any two subroutine names must be separated by a comma. Column 72 is the last that may be used for this field.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 45127 * SUBROUTINE INDEX WRONG
*OS * 45160 * MAIN SR=XXXXXX DELETED
*OS * 45902 * OD=X : HDR1 ...
*OS * 45999 * END OF .SSTR
```

.STR Subroutine Transfer

Function:

Transfers one or more subroutines from the subroutine library on one disc unit to the subroutine library on another disc unit.

Order Card Format:

$$\text{.STR}\left[\text{, ID=}\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\right]\text{, }\left\{\begin{bmatrix}\text{SD}\\ \text{BD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]\text{, subr name}\left[\text{, subr name} \ldots\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, BD	Subroutine is transferred to the Basic Disc.
WD	Subroutine is transferred to the Work Disc.
0 ... F	Subroutine is transferred to the unit whose select number is specified.

CONTENT	FORMAT OR INDICATION
subr name	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD	Subroutine is transferred from the Basic Disc.
ID=0 . . . F	Subroutine is transferred from the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.
subr name. . .	This field may not extend past column 72; each name is 6 alphanumeric characters long and any two names must be separated by a comma.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2 or 3
Card reader	1
Printer	1

.STR

Specific Condition Messages:

```
*OS  *62123*  PROGRAM FILE OVERFLOW
*OS  *62161*  SR=XXXXXX NOT FOUND
*OS  *62902*  OD=X : HDR1 ...
*OS  *62999*  END OF .STR
```

.SVG Supervisor Generate

Function:

This program generates the Supervisor on the cylinder zero of the specified disc unit.

Order Card Format:

```
        ┌SD ┐
        │MD │
        │BD │
        │LD │
        │WD │
.SVG,  <│0  │>  [,VN=vol no.]
        │.  │
        │.  │
        │.  │
        └F  ┘
```

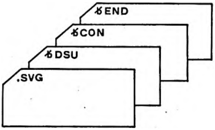
Required Card Fields:

CONTENT	FORMAT OR INDICATION
SD, MD, BD, LD	Supervisor will be generated on the Basic Disc.
WD	Supervisor will be generated on the Work Disc.
0 . . . F	Supervisor will be generated on the unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Input Card Deck Example:



Detail Card Formats:

1. DSU (Disc Unit) Card
   There are two types of DSU cards, one type identifies the DSU 160 units connected to the system, the other type identifies the DSU 110 units connected to the system.

   A. DSU 160
      Detail Card Format:
      ƀDSU 160, no. units, connect no. ,connect no.,...

Required Card Fields:

CONTENT	FORMAT OR INDICATION
no. units	This field is a maximum of 2 numeric digits and is between 1 and 16.
connect no.	Lowest connector number used to connect a DSU 160 disc unit to the system. This field is a maximum of 3 numeric digits and is between 0 and 255.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
connect no.,...	Connector numbers used to connect additional DSU 160 disc units to the system. Any two connector numbers must be separated by a comma, the range of each is between 0 and 255, and they must be listed in ascending connector number order.

B. DSU 110

Detail Card Format:

b̸DSU 110, no. units, connect no./connect no.
[, connect no./connect no....]

Required Card Fields:

CONTENT	FORMAT OR INDICATION
no. units	This field is one numeric digit long and may be between 1 and 8.

.SVG

CONTENT	FORMAT OR INDICATION
connect no./ connect no.	Lowest connector numbers used to connect a DSU 110 disc unit to the system. This field is divided into two 3 numeric digit (at maximum) parts separated by a slash character - each part representing one connector number. The range of each connector number may be between 0 and 255 and the right 3 digit value must be greater than the left value.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
connect no./ connect no....	Connector numbers used to connect additional DSU 110 disc units to the system. Any two pairs of connector numbers (used to connect one DSU 110 unit) must be separated by a comma, the range of each element of the pair must be between 0 and 255, and the pairs must appear in ascending connector order number. Each item in this field is configured in the same way as the required connect no./ connect no. field.

2. CON (Peripheral Devices Connected) Card
This card lists the type peripheral devices connected to the system as currently configured. This card, like the order cards, has optional and required fields separated by commas rather than having them begin in specific card columns.

Detail Card Format:

$$\not{b}\text{CON}\left\{\begin{bmatrix}\text{H}\\\text{B}\end{bmatrix}\right\},\left\{\begin{bmatrix}12\\16\\24\\32\end{bmatrix}\right\},\left\{\begin{bmatrix}\text{CRZ100}\\\text{CRP100/YYY}\end{bmatrix}\right\},\left\{\begin{bmatrix}\text{PRT100}\\\text{PRTXXX/YYY}\end{bmatrix}\right\}$$

$$\left[,\text{PC=}\left\{\begin{bmatrix}\text{CPZXXX/YYY}\\\text{CRP100/YYY}\end{bmatrix}\right\}\right]\left[,\text{MT=MTCXXX/Y}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
H	Devices will be used in Hollerith mode.
B	Devices will be used in Bull mode.
12	Store capacity is 12K octets.
16	Store capacity is 16K octets.
24	Store capacity is 24K octets.
32	Store capacity is 32K octets.
CRZ100	This card reader must be connected through the integrated controller.
CRP100/YYY	Model type card reader/punch connected to the system. The connector number, which may be between 0 and 255, appears at YYY.

CONTENT	FORMAT OR INDICATION
PRT100	Model type printer connected to the system. This printer must be connected through the integrated printer controller.
PRTXXX/YYY	Model type printer connected to the system. The model numbers (118 or 120) are to appear at XXX; the connector number, which may be between 0 and 255, appears at YYY.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
PC=CPZXXX/ YYY	Model type card punch connected to the system in addition to the required reader or reader/punch unit. The model numbers (101 or 103) appear at XXX; the connector number, which may be between 0 and 255, appears at YYY.
PC=CRP100/ YYY	Model type card reader/punch connected to the system. The connector number, which may be between 0 and 255, appears at YYY.
MT=MTCXXX/ Y	Model type magnetic tape units connected to the system. The model numbers (101 or 160) appear at XXX; the number of such units connected to the system, which may be 1 to 8, appears at Y.

3. END Card
   This card indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2 and up to 16
Card reader or reader/punch	1
Card punch	0 or 1
Printer	1
Tape unit	0 to 8

Specific Condition Messages:

```
* OS * 22100 * INVALID DETAIL CARD
* OS * 22171 * DIRECTRIX WRONG
* OS * 22172 * UN=XX WRONG
* OS * 22173 * CT=XXX/YYY WRONG
* OS * 22174 * MS=XX WRONG
* OS * 22175 * H/B CODE WRONG
* OS * 22176 * XXXXXXXXX PERIPHERAL WRONG
* OS * 22177 * NUMBER OF DETAIL CARDS WRONG
* OS * 22999 * END OF .SVG
```

.SVPRT Supervisor Print

Function:

Lists the Supervisor, as present in store, at the printer.

Order Card Format:

```
                     ┌    ┐
                     │ SD │
                     │ MD │
                     │ BD │
                     │ LD │
.SVPRT  [,ID= {  0   } ]
                     │ .  │
                     │ .  │
                     │ .  │
                     │ F  │
                     └    ┘
```

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Supervisor is on the Basic Disc.
ID=0 ... F	Supervisor is on the unit whose select number is specified.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS*  23171*  DIRECTRIX WRONG
*OS*  23999*  END OF .SVPRT
```

.SVTR Supervisor Transcribe

Function:

Copies the zero cylinder of one disc onto the zero cylinder of another disc.

Order Card Format:

$$.\mathrm{SVTR}\ \left[,\mathrm{ID}=\left\{\begin{matrix}\mathrm{SD}\\ \mathrm{MD}\\ \mathrm{BD}\\ \mathrm{LD}\\ \mathrm{WD}\\ 0\\ .\\ .\\ .\\ \mathrm{F}\end{matrix}\right\}\right],\left\{\begin{matrix}\mathrm{WD}\\ 0\\ .\\ .\\ .\\ \mathrm{F}\end{matrix}\right\}\left[,\mathrm{VN{=}vol\ no.}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
WD	Cylinder is copied onto the Work Disc.
0 . . . F	Cylinder is copied onto the unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, MD, BD, LD	Cylinder is copied from the Basic Disc.
ID=WD	Cylinder is copied from the Work Disc.
ID=0 . . . F	Cylinder is copied from the unit whose select number is specified.
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	2 or 3
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 21003 * DU=X : OUT OF ORDER
*OS * 21808 * .SVTR NOT EXECUTED
*OS * 21999 * END OF .SVTR
```

.TADD Tape Add

Function:

Adds the contents of one tape reel to the end of the contents of another tape reel, numbering blocks if required and writing a new end-of-volume or end-of-file mark, as requested.

Order Card Format:

$$.\text{TADD},\ \text{IT}=\left\{\begin{bmatrix}\text{W1}\\ \text{W2}\\ \text{W3}\\ 1\\ \cdot\\ \cdot\\ \cdot\\ 8\end{bmatrix}\right\}\ \left[,\text{VN=vol no.}\right]\ ,\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\},\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right\}\ ,\ \text{OT}=\left\{\begin{bmatrix}\text{W1}\\ \text{W2}\\ \text{W3}\\ 1\\ \cdot\\ \cdot\\ \cdot\\ 8\end{bmatrix}\right\}$$

$$\left[,\text{VN=vol no.}\right]\ ,\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\},\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right\}\ \left[,\text{ET}=\left\{\begin{matrix}\text{V}\\ \text{F}\end{matrix}\right\}\right]\ \left[,\text{NB}=\left\{\begin{matrix}\text{Y}\\ \text{N}\end{matrix}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
IT=W1, W2, W3	Tape contents to be added are of Work Tape 1, 2, or 3.

CONTENT	FORMAT OR INDICATION
IT=1 . . . 8	Tape contents to be added are of the tape unit whose select number is specified.
P	Odd parity is checked while processing the contents of the tape unit specified to the left of this field.
O	Even parity is checked while processing the contents of the tape unit specified to the left of this field.
K	Contents of the tape unit specified to the left of this field are stored at 1600 bpi.
L	Contents of the tape unit specified to the left of this field are stored at 800 bpi.
M	Contents of the tape unit specified to the left of this field are stored at 556 bpi.
N	Contents of the tape unit specified to the left of this field are stored at 200 bpi.
OT=W1, W2, W3	Information is added to the contents of Work Tape 1, 2, or 3.
OT=1 . . . 8	Information is added to the contents of the tape unit whose select number is specified.

. TADD

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.
ET=V	End-of-volume mark is to be placed on the output reel when information has been transferred.
ET=F	End-of-file mark is to be placed on the output reel when information has been transferred.
NB=Y	Blocks of information will be numbered properly when information is transferred to the output reel.
NB=N	Block numbering will be ignored when information is transferred to the output reel.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Tape unit	2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 60999 * END OF . TADD
```

.TCP Tape Copy

Function:

Copies the contents of one tape reel onto another tape reel changing various parameters and the label as required.

Order Card Format:

$$\text{.TCP, IT=}\left\{\begin{array}{c}\text{W1}\\\text{W2}\\\text{W3}\\\text{1}\\\cdot\\\cdot\\\cdot\\\text{8}\end{array}\right\}\left[\text{, VN=vol no.}\right],\left\{\begin{array}{c}\text{P}\\\text{O}\end{array}\right\},\left\{\begin{array}{c}\text{K}\\\text{L}\\\text{M}\\\text{N}\end{array}\right\}\text{, OT=}\left\{\begin{array}{c}\text{W1}\\\text{W2}\\\text{W3}\\\text{1}\\\cdot\\\cdot\\\cdot\\\text{8}\end{array}\right\}$$

$$\left[\text{, VN=vol no.}\right],\left\{\begin{array}{c}\text{P}\\\text{O}\end{array}\right\},\left\{\begin{array}{c}\text{K}\\\text{L}\\\text{M}\\\text{N}\end{array}\right\}\left[\text{, ET=}\left\{\begin{array}{c}\text{V}\\\text{F}\end{array}\right\}\right]\left[\text{, FN=file name}\right]$$

$$\left[\text{, SF=ser file no.}\right]\left[\text{, ON=ord no.}\right]\left[\text{, DT=}\left\{\begin{array}{c}\text{DD}\\\text{date}\end{array}\right\}\right]$$

$$\left[\text{, RP=retent per}\right]$$

.TCP

Required Card Fields:

CONTENT	FORMAT OR INDICATION
IT=W1, W2, W3	Information is copied from Work Tape 1, 2, or 3.
IT=1 ... 8	Information is copied from the unit whose select number is specified.
P	Odd parity of the unit specified to the left of this field is checked during processing.
O	Even parity of the unit specified to the left of this field is checked during processing.
K	Information on the unit specified to the left of this field is written at 1600 bpi.
L	Information on the unit specified to the left of this field is written at 800 bpi.
M	Information on the unit specified to the left of this field is written at 556 bpi.
N	Information on the unit specified to the left of this field is written at 200 bpi.
OT=W1, W2, W3	Information is copied onto Work Tape 1, 2, or 3.
OT=1 ... 8	Information is copied onto the tape unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.
ET=V	Tape reel will contain a file which ends on another volume. An end-of-volume mark is written.
ET=F	Tape reel will contain a file which ends on this volume. An end-of-file mark is written.
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.
SF=ser file no.	The ser file no. portion of this field is a maximum of 6 alphanumeric characters.
ON=ord no.	The ord no. portion of this field is a maximum of 2 numeric characters.
DT=DD	This form indicates that the date maintained by EDOS is to be used.
DT=date	The date portion of this field is 5 numeric characters long in the form YYDDD (in decimal).
RP=retent per	The retent per portion of this field is a maximum of 3 numeric characters and represents the number of days for which the file is to be retained.

.TCP

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Tape unit	2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 58999*  END OF .TCP
```

.TDAFT Tape To Disc All Files Transfer

Function:

Transfers all files from a specific tape unit to a specific disc unit.

Order Card Format:

$$.\text{TDAFT, IT=}\left\{\begin{bmatrix}1\\ .\\ .\\ .\\ 8\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right],\left\{\begin{bmatrix}P\\ O\end{bmatrix}\right\},\left\{\begin{bmatrix}K\\ L\\ M\\ N\end{bmatrix}\right\}\text{, OD=}\left\{\begin{bmatrix}SD\\ MD\\ BD\\ LD\\ WD\\ 0\\ .\\ .\\ .\\ F\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
IT=1 . . . 8	Files are on the tape unit whose select number is specified.
P	Odd parity is checked as files are transferred.

.TDAFT

CONTENT	FORMAT OR INDICATION
O	Even parity is checked as files are transferred.
K	Files are stored at 1600 bpi.
L	Files are stored at 800 bpi.
M	Files are stored at 556 bpi.
N	Files are stored at 200 bpi.
OD=SD, MD, BD, LD	Files are to be written on the Basic Disc.
OD=WD	Files are to be written on the Work Disc.
OD=0 . . . F	Files are to be written on the disc unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
*OS  * 55999 *  END OF .TDAFT
```

.TDDFT Tape To Disc Data File Transfer

Function:

Transfers a specific data file from a tape unit to a disc unit.

Order Card Format:

$$.\text{TDDFT, IT=}\left\{\begin{bmatrix}1\\ \cdot\\ \cdot\\ \cdot\\ 8\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]\text{ , file name, }\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\},\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right\}.$$

$$\text{, OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
IT=1 ... 8	Data file is on the tape unit whose select number is specified.
file name	This field is a maximum of 12 alphanumeric characters.
P	Odd parity is checked as the file is transferred.
O	Even parity is checked as the file is transferred.
K	Data file is stored at 1600 bpi.
L	Data file is stored at 800 bpi.
M	Data file is stored at 556 bpi.
N	Data file is stored at 200 bpi.
OD=SD, MD, BD, LD	Data file is to be stored on the Basic Disc.
OD=WD	Data file is to be stored on the Work Disc.
OD=0 ... F	Data file is to be stored on the disc unit whose select number is specified.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

.TDDFT

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1
Tape unit	1

Specific Condition Messages:

```
* OS*  55134  * FN=XXXXXXXXXXXXX NOT FOUND
* OS*  55179  * FN=XXXXXXXXXXXXX LABEL WRONG
* OS*  55999  * END OF .TDDFT
```

. TDP Tape Dump

Function:

Lists the information written on a tape reel mounted at a specific unit at the printer.

Order Card Format:

$$\text{. TDP,} \left\{\begin{bmatrix} \text{W1}\\ \text{W2}\\ \text{W3}\\ 1\\ \cdot\\ \cdot\\ \cdot\\ 8 \end{bmatrix}\right\}, \left\{\begin{bmatrix} \text{P}\\ \text{O} \end{bmatrix}\right\}, \left\{\begin{bmatrix} \text{K}\\ \text{L}\\ \text{M}\\ \text{N} \end{bmatrix}\right\}, \left\{\begin{bmatrix} \text{AN}\\ \text{HX} \end{bmatrix}\right\} \left[\text{, BS= start blk no.}\right]$$

$$\left[\text{, BN=no. blks}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
W1, W2, W3	Information is listed from Work Tape 1, 2 or 3.
1 ... 8	Information is listed from the unit whose select number is specified.

.TDP

CONTENT	FORMAT OR INDICATION
P	Odd parity is checked as listing progresses.
O	Even parity is checked as listing progresses.
K	Tape information is stored at 1600 bpi.
L	Tape information is stored at 800 bpi.
M	Tape information is stored at 556 bpi.
N	Tape information is stored at 200 bpi.
AN	Listing is alphanumeric.
HX	Listing is hexadecimal.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
BS=strt blk no.	The strt blk no. portion of this field is up to 5 numeric characters long.
BN=no. blks	The no. blks portion of this field is a maximum of 5 numeric characters long.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Tape unit	1
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS *  56999 *  END OF .TDP
```

.TDPFT   Tape To Disc Program File Transfer

Function:

Transfers a specific program file from a tape unit to a disc unit.

Order Card Format:

$$.\text{TDPFT, IT=}\left\{\begin{bmatrix}1\\ \cdot\\ \cdot\\ \cdot\\ 8\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]\text{ , file name, }\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\}\text{, }\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right\}$$

$$\text{,OD=}\left\{\begin{bmatrix}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
IT=1 . . . 8	Program file is on the tape unit whose select number is specified.
file name	This field is a maximum of 12 alphanumeric characters.
P	Odd parity is checked as the program file is transferred.
O	Even parity is checked as the program file is transferred.
K	Program file is stored at 1600 bpi.
L	Program file is stored at 800 bpi.
M	Program file is stored at 556 bpi.
N	Program file is stored at 200 bpi.
OD=SD, MD, BD, LD	Program file is transferred to the Basic Disc.
OD=WD	Program file is transferred to the Work Disc.
OD=0 . . . F	Program file is transferred to the disc unit whose select number is specified.

.TDPFT

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is a maximum of 6 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Tape unit	1
Printer	1

Specific Condition Messages:

```
* OS * 55134 * FN=XXXXXXXXXXXX NOT FOUND
* OS * 55179 * FN=XXXXXXXXXXXX LABEL WRONG
* OS * 55999 * END OF .TDPFT
```

.TFLP Tape File Labels Print

Function:

Outputs all the file labels from a specific tape unit at the printer.

Order Card Format:

$$.\text{TFLP, IT=}\left\{\begin{bmatrix}1\\ .\\ .\\ .\\ 8\end{bmatrix}\right\}\left[\text{, VN=vol no.}\right] \quad ,\left\{\begin{bmatrix}\text{P}\\ \text{O}\end{bmatrix}\right\},\left\{\begin{bmatrix}\text{K}\\ \text{L}\\ \text{M}\\ \text{N}\end{bmatrix}\right\}$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
IT=1 ... 8	File labels are on the tape unit whose select number is specified.
P	Odd parity is checked during processing.
O	Even parity is checked during processing.
K	File labels are stored at 1600 bpi.
L	File labels are stored at 800 bpi.

. TFLP

CONTENT	FORMAT OR INDICATION
M	File labels are stored at 556 bpi.
N	File labels are stored at 200 bpi.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
VN=vol no.	The vol no. portion of this field is 12 alphanumeric characters long.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Tape unit	1
Printer	1

Specific Condition Messages:

```
* OS * 55999 * END OF .TFLP
```

. TLW Tape Label Write

Function:

Writes a standard label on a tape reel mounted on the tape unit specified.

Order Card Format:

$$.\text{TLW},\left[\begin{matrix}\text{W1}\\\text{W2}\\\text{W3}\\1\\.\\.\\.\\8\end{matrix}\right],\left\{\begin{matrix}\text{P}\\\text{O}\end{matrix}\right\},\left[\begin{matrix}\text{K}\\\text{L}\\\text{M}\\\text{N}\end{matrix}\right],\left\{\begin{matrix}7\\9\end{matrix}\right\},\left\{\begin{matrix}\text{F}\\\text{V}\end{matrix}\right\},\ \text{vol no., user name,}$$

$$\text{file name, ser file no., ord no.,}\quad\left[,\text{DT=}\left\{\begin{matrix}\text{DD}\\\text{date}\end{matrix}\right\}\right]$$

Required Card Fields:

CONTENT	FORMAT OR INDICATION
W1, W2, W3	Label is to be written on Work Tape 1, 2 or 3.
1 . . . 8	Label is to be written on the unit whose select number is specified.

.TLW

CONTENT	FORMAT OR INDICATION
P	Odd parity is checked while writing.
O	Even parity is checked while writing.
K	Information is to be written at 1600 bpi.
L	Information is to be written at 800 bpi.
M	Information is to be written at 556 bpi.
N	Information is to be written at 200 bpi.
7	Tape is 7-track type.
9	Tape is 9-track type.
F	Information to be written will be complete on this reel. An end-of-file mark is written.
V	Information to be written will be continued on another volume. An end-of-volume mark is written.
vol no.	This field is a maximum of 6 alphanumeric characters.
user name	This field is a maximum of 12 alphanumeric characters.
file name	This field is a maximum of 12 alphanumeric characters.
ser file no.	This field is a maximum of 6 alphanumeric characters.

CONTENT	FORMAT OR INDICATION
ord no.	This field is a maximum of 4 numeric characters and is coded in decimal.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
DT=DD	Date to be used in writing the label is that maintained by EDOS.
DT=date	The date portion of this field is 5 numeric characters long and is to be coded in the form YYDDD (in decimal).

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Tape unit	1
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 57187 * RECORDING MODE WRONG
* OS * 57910 * OT=X
* OS * 57999 * END OF .TLW
```

.TPG Test Program Generate

Function:

Inserts corrections into an existing program and/or causes selected portions of store used by the program to be listed during program execution. This establishes the program as a test program.

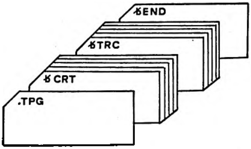
Order Card Format:

.TPG, pgm name

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Input Card Deck Example:



Detail Card Formats:

1. CRT (Correction) Card
   This card is used to insert corrections into the selected program.

COLUMNS	CONTENTS
1 - 4	ᵬCRT
5 - 6	Number (in hexadecimal) of correction characters in this card.
7 - 10	Store address (in hexadecimal) at which the correction is to begin.
11 - 72	Correction characters in machine language. These are punched in hexadecimal code.
73 - 78	Blank
79 - 80	Number of the segment (in decimal) where the correction is to be inserted.

2. TRC (Trace) Card
   These cards identify the store areas that are to be listed during each program execution.

COLUMNS	CONTENTS
1 - 4	ᵬTRC
5 - 6	Number (in decimal) of the segment where the beginning trace point is to be inserted.

COLUMNS	CONTENTS
7 - 10	Store address (in hexadecimal) where the jump to the trace instruction is to be inserted.
11 - 14	First store address (in hexadecimal) which is to be listed at the printer.
15 - 18	Number (in hexadecimal) of store locations to be listed.
19 - 80	Blank

3. END Card
This card indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

```
* OS * 40100 * INVALID DETAIL CARD
* OS * 40101 * DETAIL CARD OVERFLOW
* OS * 40102 * ADDRESS FIELD WRONG
* OS * 40103 * INVALID CARD DATA
* OS * 40104 * CARD DATA LENGTH WRONG
* OS * 40120 * PROGRAM FILE OVERFLOW
* OS * 40123 * PROGRAM INDEX OVERFLOW
* OS * 40132 * SPACE NOT AVAILABLE
* OS * 40145 * SG=XX WRONG
* OS * 40146 * SG=XX NOT FOUND
* OS * 40170 * GENERATED PROGRAM OVERFLOW
* OS * 40189 * TRC POINT XXXX WRONG
* OS * 40902 * OD=X : HDR1 ...
* OS * 40999 * END OF .TPG
```

. TPGSC Test Program Generate And Scratch

Function:

Inserts corrections into an existing program and/or causes selected portions of store used by the program to be listed during program execution. This establishes the program as a test program. This order also deletes all other test programs from a program file.

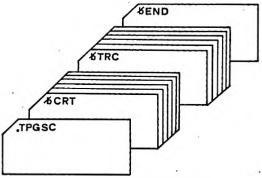
Order Card Format:

. TPGSC, pgm name

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This field is a maximum of 8 alphanumeric characters.

Input Card Deck Example:



Detail Card Formats:

1. CRT (Correction) Card
   This card is used to insert corrections into the selected program.

COLUMNS	CONTENTS
1 - 4	ƀCRT
5 - 6	Number (in hexadecimal) of correction characters in this card.
7 - 10	Store address (in hexadecimal) at which the correction is to begin.

. TPGSC

COLUMNS	CONTENTS
11 - 72	Correction characters in machine language. These are punched in hexadecimal code.
73 - 78	Blank
79 - 80	Number of the segment (in decimal) where the correction is to be inserted.

2. TRC (Trace) Card
These cards identify the store areas that are to be listed during each program execution.

COLUMNS	CONTENTS
1 - 4	ƀTRC
5 - 6	Number (in decimal) of the segment where the beginning trace point is to be inserted.
7 - 10	Store address (in hexadecimal) where the jump to the trace instruction is to be inserted.
11 - 14	First store address (in hexadecimal) which is to be listed at the printer during program execution.
15 - 18	Number (in hexadecimal) of store locations to be listed.
19 - 80	Blank

3. END Card

This card indicates that all the cards to be processed by this order have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Blank

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

* OS * 40100 *	INVALID DETAIL CARD
* OS * 40101 *	DETAIL CARD OVERFLOW
* OS * 40102 *	ADDRESS FIELD WRONG
* OS * 40103 *	INVALID CARD DATA
* OS * 40104 *	CARD DATA LENGTH WRONG
* OS * 40120 *	PROGRAM FILE OVERFLOW
* OS * 40123 *	PROGRAM INDEX OVERFLOW
* OS * 40132 *	SPACE NOT AVAILABLE

.TPGSC

```
* OS * 40145 * SG=XX WRONG
* OS * 40146 * SG=XX NOT FOUND
* OS * 40170 * GENERATED PROGRAM OVERFLOW
* OS * 40189 * TRC POINT XXXX WRONG
* OS * 40902 * OD=X : HDR1 ...
* OS * 40999 * END OF .TPGSC
```

. TRACE Load Program By Trace

Function:

Loads a program residing in a program file on a specific disc unit into core store, initiates its execution, and updates its program file table entry. It also lists at the printer program loops during processing, for verification of program operation.

Order Card Format:

$$.\,\text{TRACE}\ \left[,\text{ID}=\left\{\left[\begin{array}{c}\text{SD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ .\\ .\\ .\\ \text{F}\end{array}\right]\right\}\right],\ \left\{\begin{array}{c}\text{TP=pgm name}\\ \text{pgm name}\end{array}\right\}\ \left[,\text{HT}=\left\{\left[\begin{array}{c}\text{Y}\\ \text{N}\end{array}\right]\right\}\right]$$

$$\left[,\text{FL}=\left\{\left[\begin{array}{c}\text{Y}\\ \text{N}\end{array}\right]\right\}\right]\ \left[,\text{UA=character string}\right]$$

.TRACE

Required Card Fields:

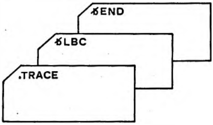
CONTENT	FORMAT OR INDICATION
TP=pgm name	The pgm name portion of this field is a maximum of 8 alphanumeric characters.
pgm name	This field is a maximum of 8 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
ID=SD, BD, LD	Program is on the Basic Disc.
ID=WD	Program is on the Work Disc.
ID=0 ... F	Program is on the unit whose select number is specified.
HT=Y	A processing halt will occur before execution of the program begins.
HT=N	No processing halt will occur before execution of the program begins.
FL=Y	Store area not specifically reserved for use by EDOS will be loaded with 00001010 in each octet before the program is loaded for execution.
FL=N	No clearing of store occurs before the program is loaded for execution.

CONTENT	FORMAT OR INDICATION
UA=character string	The character string portion of this field is a maximum of 32 alphanumeric characters.

Input Card Deck Example:



Detail Card Formats:

1. LBC (Label Control) Card
   This card provides the updating information for the program file table entry. If the optional card fields are coded, the respective portions of the entry are replaced as coded; if a field is not coded, the respective portion of the entry remains as it was before this order began processing.

```
ƀLBC pgm name, file code   [, FN=file name] [, SF=ser file no.]
  [, DT=date] [, MU=unit no.]      [, AU=unit no.]
                               ┌ K ┐
  [, CO=YNƀ string]   [, PK= { │ L │ } ]
                               │ M │
                               └ N ┘
```

Required Card Fields:

CONTENT	FORMAT OR INDICATION
pgm name	This name must be the same as that in the order card and is a maximum of 8 alphanumeric characters.
file code	This field is a maximum of 6 alphanumeric characters.

Optional Card Fields:

CONTENT	FORMAT OR INDICATION
FN=file name	The file name portion of this field is a maximum of 12 alphanumeric characters.
SF=ser file no.	The ser file no. portion of this field is 6 alphanumeric characters long.
DT=date	The date portion of this field may be 5 characters long in the configuration YYDDD (in decimal) or one of 6 numeric characters, each interpreted as follows:

CHARACTER	INDICATES
0	Date is that maintained by EDOS.
1	Date is found in character positions 1 to 6 of the user area.
2	Date is found in character positions 7 to 12 of the user area.
3	Date is found in character positions 13 to 18 of the user area.
4	Date is found in character positions 19 to 24 of the user area.
5	Date is found in character positions 25 to 30 of the user area.

MU=unit no.	The unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
AU=unit no.	The unit no. portion of this field is one character long and may be between 0 and F for disc units and 1 and 8 for tape units.
CO=YNɓ string	Character string which provides several different options to the programmer. The YNɓ string portion of this field is 6 alphanumeric characters long and each of the character positions may contain a Y or N character, or blank, depending on the options selected. The blank indicates that the existing contents of that position are to be retained. The choice in each character position has a yes/no effect on various operations as follows:

.TRACE

CHARACTER	OPERATION
1	Check file name
2	Check file serial number
3	Check volume sequence in multi-volume file
4	Check file creation date
5 (input files only)	Disable all file operations
6	Print header label

PK=K	Tape file recording density is 1600 bpi.
PK=L	Tape file recording density is 800 bpi.
PK=M	Tape file recording density is 556 bpi.
PK=N	Tape file recording density is 200 bpi.

2. END Card
This card is used to indicate that all the detail cards required by this order program have been read.

COLUMNS	CONTENTS
1 - 4	ƀEND
5 - 80	Not used

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1 or 2
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS * 37100 * INVALID DETAIL CARD
*OS * 37134 * FC=XXXXXX NOT FOUND
*OS * 37140 * DT=XXXXX INVALID
*OS * 37147 * TP/PN=XXXXXXXX INVALID
*OS * 37180 * FILE TABLE NOT FOUND
*OS * 37181 * MU/AU=X WRONG
*OS * 37182 * CO=XXXXXX WRONG
*OS * 37183 * PK=X WRONG
*OS * 37184 * PROGRAM NOT LOADED
*OS * 37185 * FILE TABLE ADDRESS WRONG
*OS * 37808 * .TRACE NOT EXECUTED
*OS * 37999 * END OF .TRACE
```

.UAL User Area Load

Function:

Loads information into the EDOS user area (0052 to 0083, decimal).

Order Card Format:

.UAL, user data

Required Card Fields:

CONTENT	INDICATES
user data	This field is a maximum of 32 alphanumeric characters.

Peripheral Devices Required:

DEVICE	QUANTITY
Disc unit	1
Card reader	1
Printer	1

Specific Condition Messages:

```
*OS  * 20208  * IMPOSSIBLE TO PROCEED/LOAD PILOT ZERO
*OS  * 20999  * END OF .UAL
```

C. GUIDE TO GENERIC TERMS AND MNEMONICS

a. Introduction

A variety of generic terms and abbreviations or mnemonics exists in the order card descriptions. The difference between the two is best demonstrated by example. The following example shows the format for the .SVG (Supervisor Generate) order card:

$$\text{.SVG,}\left\{\begin{bmatrix}\text{SD}\\ \text{MD}\\ \text{BD}\\ \text{LD}\\ \text{WD}\\ 0\\ \cdot\\ \cdot\\ \cdot\\ \text{F}\end{bmatrix}\right\}\quad\left[\text{, VN=vol no.}\right]$$

The generic term in the example is vol no. In coding the order card vol no. must be replaced by the applicable volume number in the format specified in the description. The mnemonics in this description (other than SVG) are SD, MD, BD, LD,WD, 0 . . . F, and VN=. When any of these is to be coded, it must appear as it does in the order card description. If the Work Disc is selected for processing by .SVG and the volume number is 123ABC, the coding would appear as follows:

```
.SVG, WD, VN=123ABC
```

In the order card format descriptions, the mnemonics always appear in capital letters or with special symbols; generic terms are written in lower case with the exception of the YNb̸ string in the LBC card. This is a generic term but appears in the descriptions with capital letters.

The following lists describe generic terms as to their significance and in some cases, format, and the mnemonics and their significance.

b. Generic terms

TERM	SIGNIFICANCE
alt unit no.	Select number of the disc or tape unit on which is mounted other than the first volume of a multi-volume file.
char no.	Number of the character within a sector that is to be involved in processing. If the sector is written in 6-bit mode the character number may be in the range 1 to 384; if 8-bit mode is used, the range is 1 to 288.
character string	This is replaced by the number and type characters specified in the particular order card description. If the format is not delimited, then any character in the GE-100 printing set may be used as the characters in the field are not examined for other considerations.
connect no.	Connector number through which a specific device is connected to the system. This field is up to 3 numeric characters long and may be in the range 0 to 255.
date	Date to be used in processing the order in whose card this field appears. Specifications for the format of this field appear in the order or detail card description but it may only be written in one of two ways. If it is written as a single

TERM	SIGNIFICANCE
	numeric digit in the range 0 to 5, it indicates that the date to be used in processing appears in a specific portion of the user area. This field may also be written in 5 numeric characters in the form YYDDD where YY is replaced by the last two digits of the year and DDD is the number of days from January 1 of that year to the date in question. The range of the DDD portion is 1 to 365.
disc file name	Name of a file residing on a disc unit. This file is to be used in processing the order program and may be up to 12 alphanumeric characters long in the format for names of disc files specified for use with GE-120/GE-130 EDOS.
file code	Code by which the file to be used in processing is to be identified. This field is a maximum of 6 alphanumeric characters.
file name	Name of a file to be used in processing the order program. This field is up to 12 alphanumeric characters long in the format for names of disc files specified for use with GE-120/GE-130 EDOS.
first cyl/no. cyls	Number of the first cylinder that may be used for processing the order program and the total number of cylinders that may be used. The entire field is a maximum of 6 numeric characters. The first cyl portion is always 3 numeric characters long while the no. cyls portion is from 1 to 3 numeric characters long.

TERM	SIGNIFICANCE
first sect	Number or address of the first disc sector that may be involved in processing. This field is 5 numeric characters long.
ind cyl	Number of the cylinder assigned as the index cylinder of a specific file. This field is always 3 numeric characters long and has a maximum value of 039 for a DSU110 unit and 199 for a DSU160 unit.
inf length	Number (in decimal) of characters which are to be processed. The length and composition of this field is delimited in the specification of the order card in which it is used.
inf string	Specific characters to be used in execution of an operation. The length and composition of this field is delimited in the specification of the order card in which it is used.
last cyl	Highest numbered cylinder which may be used in processing. This field is 3 numeric characters long and has a maximum value of 039 for a DSU110 unit and 199 for a DSU160 unit.
limit adr	This field is a maximum of 8 hexadecimal characters long. The first 4 characters represent the first address involved in processing; the second 4 characters represent the last address to be involved in processing.
main unit no.	Select number of the disc or tape unit on which the first volume of a multi-volume file is mounted.

TERM	SIGNIFICANCE
no. blks	Number of tape blocks which are to be involved in processing. This field is a maximum of 5 numeric characters and is coded in decimal.
no. cyls	Total number of cylinders which are to be involved in processing. This field is a maximum of 3 numeric characters and is coded in decimal.
no. print pos	Number of printer character positions required during execution of the object program compiled by the compiler under EDOS control. This field is up to 3 numeric characters long and is coded in decimal.
no. sect	Total number of sectors which are to be involved in processing. This field is a maximum of 5 numeric characters and is coded in decimal.
no. units	Total number of units of a specific type which are connected to the system. This figure may be up to 2 numeric characters long and is coded in decimal.
object periph	This field identifies the compiled program's peripheral device requirements. The field is 3 alphabetic characters long and uses the characters T (for magnetic tape units), D (for disc units), or C (for card punch units). The quantity of each of these type units is not specified, only that such a type unit is required.
obj pgm adr	Object program load address. This is a sector address and is 5 numeric characters long and coded in decimal.

TERM	SIGNIFICANCE
ord no.	Order or position number of a specific volume in a multi-volume file. This field is a maximum of 4 numeric characters and is coded in decimal.
pgm file name	Name of a file containing programs as opposed to a file containing data. This field is a maximum of 12 alphanumeric characters, the first 2 of which must be SD, MD, or LD, depending on whether the file is stored on a System Disc, Master Disc, or Library Disc.
pgm name	Name of a program to be involved in processing. This field is a maximum of 8 alphanumeric characters.
punch code	Object program punching code which appears in the first 4 columns of each object program card. This field is 4 alphanumeric characters long.
retent per	Number of days for which a specific file or item of information is to be retained. This field is 3 numeric characters long and represents the retention period in number of days from file or information item creation.
sect adr	Sector address on a disc unit. This field is 5 numeric characters long. The first 3 characters represent the cylinder number; the last 2 characters are the sector number. This field is coded in decimal.

TERM	SIGNIFICANCE
seg no.	Number of a program segment involved in processing. This field is 2 numeric characters long and is in the range 00 to 99 if the program is on a Master Disc and 01 to 98 if the program is on a disc other than a Master Disc.
ser file no.	Serial file number of a file. This field is a maximum of 6 alphanumeric characters.
start blk no.	Number of the tape information block from which processing is to begin. This field is a maximum of 5 alphanumeric characters.
start seg no.	Number of the program segment from which processing is to begin. This field is 2 numeric characters long and is in the range 00 to 99 if the program is on a Master Disc and 01 to 98 if the program is on a disc other than a Master Disc.
subr name	Name of a subroutine to be involved in processing. This field is 6 alphanumeric characters long.
unit no.	Logical or select number of a disc or tape unit. The range of values for this field is 0 to F for disc units and 1 to 8 for tape units.
user data	User coded data. The contents of this field are defined and delimited in the description of the order or detail card which uses it.

TERM	SIGNIFICANCE
user name	User supplied name for a disc volume. This field is a maximum of 6 alphanumeric characters.
vol no.	Volume number of a specific volume. This field is a maximum of 6 alphanumeric characters. Generally, if the field is required, the volume number is being assigned; if the field is optional, the volume number is being checked.
YNb̸ string	This is a 6-character field whose contents are limited to any combination of Y or N characters, or blanks. Each character position in the string has a different significance. If a blank appears in any position it indicates that that position is inappropriate in the particular context or, when this field is being used for replacement, that the original contents of the character position are to be retained. The Y and N characters have a yes/no effect on various operations as in the following list.

CHARACTER POSITION	OPERATION
1	check file name
2	check file serial number
3	check volume sequence in multi-volume file.

TERM	SIGNIFICANCE CHARACTER POSITION	 OPERATION
	4	check file creation date
	5 (input file only)	disable all file operations
	6	print header label
YYDDD	see date	

c. Mnemonics

The following list describes the significance of those terms which, when encountered in an order or detail card format description, must be coded exactly as they appear.

TERM	SIGNIFICANCE
AN	Information referred to is in alphanumeric mode.
AS	In an SPG compilation, the auxiliary statements follow the SPG macrostatements on disc.
AU=	Alternate unit. The character which follows the = character indicates the unit on which is mounted a volume of the file involved in processing other than the first volume.
B	Peripheral devices referred to are to be used in Bull mode.

TERM	SIGNIFICANCE
BD	Basic Disc.
BN=	Number of tape blocks. The value which follows the = character indicates the number of information blocks on tape which are to be involved in processing.
BS=	Block starting number. The value which follows the = character indicates that number of the block on tape from which processing is to begin.
CM=	Comment. The characters following the = character are to be output at the printer, as coded, at an appropriate time.
CO=	The 6-character portion of this field that follows the = character provides various processing options for the programmer. The options are described under YNɓ string in the description of generic terms.
CPZXXX/YYY	Identification of the card punch and the connector through which it is connected to the system. XXX is to be replaced by either model number permitted (101 or 103) and YYY is to be replaced by the connector number, in the range 0 to 255.
CRP100/YYY	Identification of the card reader/punch and the connector through which it is connected to the system. YYY is to be replaced by the connector number, in the range 0 to 255.

TERM	SIGNIFICANCE
CRZ100	Identification of the card reader connected to the system.
DD	The date, as maintained by EDOS, is to be used in processing. This date is input by means of the .INT order card.
DT=	Date. The characters following the = character identify the date or the location of the date to be used in processing. The date may be written in 5 numeric characters in the form YYDDD where YY is the last 2 digits of the year and DDD is the number of days from January 1 of that year (in decimal). In some cases, DD may follow the = character indicating that the date maintained by EDOS is to be used. The location of the date in the user area may, in other cases, be signified by a single decimal digit.
ET=	End type of a volume. The character following the = character indicates whether the file ends on this volume (if it is an F character) or if it is continued on another volume (if it is a V character).
F	When this character follows the ET= mnemonic, it indicates that a file ends on the specific volume being processed. Otherwise, it may be a hexadecimal number and refer to the select number of a disc unit.

TERM	SIGNIFICANCE
FL=	The character following the = character indicates if store areas not used by EDOS will be cleared while processing the order program. If the character is a Y, the area will be cleared; if N, the area will not be cleared.
FN=	The characters that follow the = character represent the name of a file involved in processing.
FS=	First sector. The characters that follow the = character represent the address of the first sector to be used in processing.
H	The peripheral devices connected to the system are to be used in Hollerith mode.
HT	Indicates that a halt occurs at some point in the processing of this order.
HX	The information referred to appears in hexadecimal format.
I=	Index. The value that follows the = character is the number of the cylinder that is to be used as the index to a specific file.
IC	EDOS assigns the cylinder that is to be used as the index cylinder of a specific file.
ID=	Input disc. The characters that follow the = character determine the disc from which information will be taken for processing this order.

TERM	SIGNIFICANCE
	SD, MD, BD, or LD indicate that the Basic Disc will be accessed; WD indicates that the Work Disc will be accessed; or the hexadecimal numbers 0 ... F indicate the select number of the unit to be accessed.
IT=	Input tape. The characters that follow the = character determine the tape unit from which information will be taken for processing this order. W1, W2, and W3 identify Work Tape 1, 2, or 3; the decimal numbers 1 ... 8 provide the logical number of the unit to be accessed.
K	Recording density of information on the tape reel referred to is 1600 bpi.
L	Recording density of information on the tape reel referred to is 800 bpi.
LC=	Last cylinder. The value that follows the = character is the number of the highest numbered, or last, cylinder that may be used in processing this order program.
LD	Library Disc. If this is coded following ID= or OD= the Basic Disc will be accessed for information.
LR=	Library relocation. The value that follows the = character represents the number of cylinders that a specific library must be moved to permit insertion of additional information in an adjacent library.

TERM	SIGNIFICANCE
LS=	Last sector. The value that follows the = character represents the address of the last sector that may be used in processing.
M	Recording density of information on the tape reel referred to is 556 bpi.
M=	Main zone. The value that follows the = character represents the number of the first cylinder assigned to the main zone of a specific file and the total number of cylinders assigned to the main zone of that file.
MD	Master Disc. If this is coded following ID= or OD= the Basic Disc will be accessed for information.
ME=	Main extension. The value following the = character represents the total number of cylinders assigned to the main zone of a specific file.
MS=	Memory size. The value following the = character indicates the store size required for object program execution. The values may be 12, 16, 24, or 32.
MT=	Magnetic tape. The value that follows the = character represents the model number and quantity of magnetic tape units connected to the system.

TERM	SIGNIFICANCE
MTCXXX/Y	Model number and quantity of magnetic tape units connected to the system. The model number (101 or 160) of the unit appears at XXX and the quantity connected appears at Y.
MU=	Main unit. The value which follows the = character represents the select number of the unit on which is mounted the first volume of a multivolume file.
N	No. Where a processing option is offered to the programmer, this indicates that the option has been ignored. This character may also indicate that recording density of the information on the tape reel referred to is 200 bpi.
NB	Numbered blocks. This indicates that the tape reel referred to has numbered blocks or that in transferring information to a tape reel, blocks are to be numbered or renumbered.
NL	No listing. Indicates that no object program listing is required during assembly or compilation.
O	Even parity is checked on the unit of information referred to.
O=	Overflow zone. The value that follows the = character represents the number of the first

TERM	SIGNIFICANCE
	cylinder assigned to the overflow zone of a specific file and the total number of cylinders assigned to the overflow zone of that file.
OC=	Object configuration. The characters which follow the = character indicate which type peripheral devices are required for object program execution: T for magnetic tape units; D for disc units; and C for card punch units.
OD=	Output disc. The characters that follow the = character determine the disc onto which information will be output while processing this order. SD, MD, BD, or LD indicate that the Basic Disc will be used for output; WD indicates that the Work Disc will be used for output; or the hexadecimal numbers 0 ... F indicate the select number of the unit to be used.
OE=	Overflow zone extension. The value following the = character represents the total number of cylinders assigned to the overflow zone of a specific file.
OL	Object listing. An object listing is to be output during program assembly or compilation.
ON=	Order number. The value following the = character indicates the sequential position, in a file, of the volume being processed.
OP	Object program. Information referred to is an object program.

TERM	SIGNIFICANCE
OS=	Output sector. The value following the = character represents the first sector address at which output information is to be loaded.
OT=	Output tape. The characters that follow the = character determine the tape unit onto whose reel information will be output while processing this order. W1, W2, and W3 indicate that Work Tape 1, Work Tape 2, or Work Tape 3 will be used for output; or the numbers 1 ... 8 indicate the select number of the unit to be used.
OV	Overflow zone. The overflow zone of the file referenced is to be processed.
P	Odd parity is checked while information is being processed.
PC=	Punched card. The value that follows the = character represents the model type of the card punch connected to the system and the connector number through which is connected.
PK=	Packing. The character that follows the = character indicates the recording density of the information on the tape reel referred to. The characters and the recording density they indicate are as follows:

TERM	SIGNIFICANCE

CHARACTER	RECORDING DENSITY
K	1600 bpi
L	800 bpi
M	556 bpi
N	200 bpi

PN=	Program name. The characters that follow the = character name the program to be processed.
PR=	Printer. The value that follows the = character represents the number of character positions per line required of the printer when the object program just compiled is executed.
PRT100	This field identifies the model type printer connected to the system.
PRTXXX/YYY	This field identifies the model type printer connected to the system. The model numbers, 118 or 120, appear at XXX; the connector number through which the printer is connected appears at YYY.
RE	Real extension. This field indicates that whatever number of cylinders is required (if they are available on the disc unit) will be assigned to the file.

TERM	SIGNIFICANCE
RP=	Retention period. The value that follows the = character represents the period, in number of days, for which the file is to be retained.
SD	System Disc. If this is coded following ID= or OD= the Basic Disc will be accessed for information.
SF=	Serial file. The value that follows the = character represents the serial file number of the file being processed.
SG=	Segment. The value that follows the = character represents the number of the program segment being processed.
SN=	Sector number. The value that follows the = character represents the total number of disc sectors that are to be involved in processing.
SS=	Starting segment. The value that follows the = character represents the number of the first segment to be involved in processing.
TP=	Test program. The test program that is to be involved in processing is named following the = character.
UA=	User area. The contents and format of the user-coded data which follows the = character are included in the description of the order or detail card which uses this field.

TERM	SIGNIFICANCE
V	This character indicates that a specific file is continued on another volume.
VN=	Volume number. The characters following the = character represent the number of the volume being processed. Generally, when this entire field is required, it indicates that the volume number is being assigned; when the field is optional, the volume number is being checked.
WD	Work Disc.
WD=	The hexadecimal digit that follows the = character identifies the disc unit that is assigned as the Work Disc.
W1=	Work Tape 1. The digit that follows the = character identifies the tape unit that is assigned as Work Tape 1.
W2=	Work Tape 2. The digit that follows the = character identifies the tape unit that is assigned as Work Tape 2.
W3=	Work Tape 3. The digit that follows the = character identifies the tape unit that is assigned as Work Tape 3.
Y	This character indicates that a specific option has been selected rather than ignored.

TERM	SIGNIFICANCE
YYDDD	This field represents the format of the date. The first 2 characters are to be replaced by the last two digits of the year; the last 3 characters are to be replaced by the decimal number of days from January 1 of that year.
0 . . .	Elements of the decimal and hexadecimal number set are used for various purposes in EDOS. The description of the order or detail card using such numbers should be consulted for additional information.

PART III - MESSAGES AND SYSTEM HALTS

A. INTRODUCTION

While processing continues under EDOS control, informative or error messages can be output from any of three sources. The first source is the EDOS order programs, the second is EDOS subroutines, and the third is EIOS (Extended Input/Output System). From the standpoint of messages, EDOS order programs can be considered as being of two types - those that are concerned with compilation or assembly of source programs and those that are not.

In this manual, messages originating in EIOS will not be described. Neither will those originating in the assemblers and compilers that process source programs under EDOS control. Messages output by these sources are described in their respective reference manuals. Only messages and system activity accompanying these messages which have their source in EDOS subroutines, the auxiliary module of the Supervisor, and non-translating order programs are described.

The messages of interest to the operator output by non-translating EDOS order programs are of two types: those accompanied by a halt followed by job abort when processing is resumed; and those accompanied by a processing halt during which recovery action is possible. The error conditions which are not recoverable halt processing at address 02A6, the beginning of the EDOS ABORT routine. When processing begins again as a result of pressing START at the console, the job is aborted. The halt addresses of recoverable errors vary and are described elsewhere in this part of the manual.

There exist a number of error conditions which are common to several order programs. Output of these and the system activity which accompanies them is the concern of the error message subroutines which are also described in this part of the manual.

B. CLASSES OF PROCESSING HALTS AND MESSAGES BY SYSTEM ACTIVITY

When a message is output as the result of some processing condition, the system can perform in either of two ways. It can output the message and continue processing with no halt or it can output the message and halt. A strictly informative message accompanied by continued processing is more properly the concern of the programmer rather than the operator and as such, this class of message is not discussed in any great detail in this manual.

In the case of errors or certain system conditions, processing will halt. Some system halts will be accompanied by messages; others will not. When START is pressed, the job may either be aborted or may continue processing. These five form the categories of processing halts.

a. Informative messages with no processing halts

These are messages that are output by EDOS during the normal course of activity. These may indicate the beginning or end of processing of a specific order program, they may list the labels of programs residing in a file, volume numbers of a disc volume or tape reel, etc. They require no recovery activity on the part of the operator and, as such, mention of such messages is confined to mention that they are output during the course of processing.

b. Processing halts with a message before job abort

Non-recoverable errors must be followed by a job abort. When an error of this type occurs, a message is output identifying the cause of the error and processing halts at address 02A6. This is the address of the EDOS ABORT subroutine; when START at the console is pressed to resume processing, the job in which the error occurred will be aborted.

c. Processing halts with no message before job abort

Although rare, this condition is a possibility. It may occur for example, when the message subroutines of EDOS have been destroyed. Processing halts at 02A6 and when START at the console is pressed to resume processing, the job in which the error occurred will be aborted.

d. Processing halts with a message and no immediate job abort

Recovery action in the case of a processing halt at an address other than 02A6 will depend on the nature of the condition, which will be revealed in the message. Generally, each using facility will have a set of procedures which are to be followed in the case of such an occurrence. These procedures will vary from facility to facility. For example, a potential error involving the .SVTR, Supervisor Transcribe, order program involves the attempt to assign a select number to a disc unit which is out of order or not connected to the system. The following error message is output:

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* OS * 21003*  DU=X : OUT OF ORDER
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and processing halts at address 01DA. The operator has the choice of making the adjustment required and pressing START at the console, which will cause processing to continue. The operator may also make no adjustment and press START. In the latter case, processing will halt at 02A6 and the next time START is pressed, the job will be aborted. These procedures must be determined at each using facility as to whether the adjustment justifies the expenditure of time required or if efficiency is better served by aborting the job immediately.

e. Processing halts with no message and recovery action

A condition of this type poses a potential problem to the operator since the cause for the processing halt may not be immediately obvious. In this case an inspection should be made of the peripheral devices to see if any condition warranting processing halt is present. If present, the predetermined procedure should be followed. If not obviously present, a store dump should be taken and the job which was processing when the halt occurred should be aborted.

C. MESSAGE SUBROUTINES AND MESSAGES

The following subroutines are those that output messages common to many EDOS order programs. * OSDS, *STAND, and * IODC are part of the Supervisor Auxiliary Module, .SPVAUXM, which must be present in store when any order program requiring access to these messages is processing. The other message subroutines also must be present in store when potentially required but are called from the subroutine library on an individual basis.

In each message described the first two characters of the five digit message identification number are PC. This represents the program code which identifies the order program during whose processing the message was issued. Programming codes for various order programs are listed in volume 1 of the programmer's version of this manual.

a. *OSDS Operating System Disc Subroutine

This subroutine is part of .SPVAUXM, the Supervisor Auxiliary Module, and it normally resides at 02F0. It must be present in store before any of the order programs that require its functions begin processing; it functions with both DSU160 and DSU110 disc units.

The conditions examined are related to the messages this subroutine outputs. These messages, and the system activity which accompanies each, are as follows:

OS PC001* DU=X : PERSISTENT ERROR

This message is output when a persistent error occurs in trying to read from the disc unit whose select number appears at X in the message. Control is returned to the order program which was processing at the time the error occurred. The activity which must follow - as to whether recovery can be made or not - will vary from order program to order program.

* OS * PC002 * DU=X : PERSISTENT ERROR

This message is output when a persistent error occurs in trying to write on the disc unit whose select number appears at X in the message. Other considerations are as those for message PC001 output by this subroutine.

* OS * PC003 * DU=X : OUT OF ORDER

This message is output when an operation has been requested on the disc unit whose select number is output at X in the message and the unit is out of order or not connected to the system. The message is output at the printer and the printer skips to the top of the next printer page. Processing halts at address 01DA. At this time the operator may choose to make the required adjustments and press START at the console to continue processing. Control will be returned to the order program which was processing when the error occurred. If the adjustment was sufficient processing continues. If not, the activity which may then be undertaken is determined by the individual order program which uses this message.

* OS * PC004 *DU=X : POSITIONING ERROR

This message is output when the read/write head of the disc unit whose select number appears at X in the message cannot be positioned as required. Other considerations are as those for message PC001 output by this subroutine.

* OS * PC005 * DU=X : CL=YYY OVERFLOW

This message is output when a writing operation at the disc unit whose select number appears at X in this message has made an attempt to overflow the cylinder whose number appears at YYY. The address of the next character to be transferred appears at 0254 and 0255. Other considerations are as those for message PC001 output by this subroutine.

b. * STAND Order Card Standardization

This subroutine is part of the Supervisor Auxiliary Module, .SPVAUXM, and it normally resides at 02F4. It must be present in store before any of the order programs that require its functions begin processing; it functions with both DSU160 and DSU110 disc units. The conditions examined by this subroutine include: the presence or absence of required and optional card fields; the format of these fields and the separation of any two by commas; etc. These conditions are examined for both order and detail cards. Any error condition discovered by this subroutine will result in a processing halt at address 02A6. When START is pressed, the job in which the error occurred will be aborted, no error recovery being possible.

In the checking of required or optional fields, the following list shows the acceptable variations. Any value other than the ones shown for a particular field will be considered an error.

MNEMONIC IDENTIFIER	LEGAL VALUES
CK=	P, O
DF=	OP, HX, AN
DT=	DD or a numeric field, the last three digits of which may not be greater than 365.
ET=	F, V
ID=	SD, MD, BD, LD, WD, 0 . . . F
IT=	W1, W2, W3, 1 . . . 8
ME=	RE or a numeric field
OD=	SD, MD, BD, LD, WD, 0 . . . F
OT=	W1, W2, W3, 1 . . . 8
PK=	K, L, M, N,
PM=	AN, HX
RM=	6 or 8 (for disc), 7 or 9 (for tape).
SR=	Y must be the first character

The messages output by this subroutine and their probable causes are as follows. In each case the processing halts at 02A6 which will result in a job abort when START at the console is pressed.

* OS * PC020 * XX NOT FOUND

A required card field is missing. The mnemonic identifier of that field appears at XX in the message.

* OS * PC021 * XX UNKNOWN

The mnemonic identifier which is output at XX in the message is not recognized as legal for this order or detail card.

*OS * PC022* XX LENGTH WRONG

The length of the field following the mnemonic identifier output in the message at XX is incorrect.

*OS * PC023* XX NOT NUMERIC

The field which follows the mnemonic identifier output at XX in the message contains other than numeric characters.

*OS * PC024* ERROR FROM ...

The format of the order or detail card read is not correct. That portion of the order card beginning with the last field correctly formatted is output in the message.

*OS * PC025* XX=YYYYYY NOT ACCEPTED

In the application for which the order or detail card has just been read, the field output in the message at YYYYYY may not be used with the mnemonic identifier output at XX.

*OS * PC026 * XX ILLEGAL

The mnemonic identifier output at XX in the message may not be used in the order or detail card just read.

c. *IODC Input/Output Disc Check

This message subroutine is part of the Supervisor Auxiliary Module, .SPVAUXM, and must be present in store before any order programs requiring its use begin processing. It is normally located at address 02F8. This subroutine examines the order card for the legality of disc units named as the input disc and output disc, checks the presence of program files when such are required, lists volume numbers and labels and header labels, and checks volume numbers.

If MD, SD, or LD are found to be equated to ID or OD in the order card, the Basic Disc is accessed.

If an error occurs while this subroutine is processing information in the order card, a message is output and processing halts at address 02A6. When START is pressed at the console the job in which the error occurred is aborted, no recovery being possible.

The messages and probable causes of processing halts originating in this subroutine appear in the following list.

OS PC030 * ID/OD=X ILLEGAL

> The disc unit specified in the order card as either the input disc or output disc and whose select number is output at XX in the message, may not be used in this application.

OS PC031 * ID/OD=X PFL NOT FOUND

> The disc unit specified in the order card as an input disc or output disc and whose select number appears at X in the message requires a program file list in this particular application and none can be located on the unit.

OS PC032* ID/OD = MD/SD/LD NOT FOUND

> The disc unit specified in the order card as an input disc or output disc has been specified to be a Master Disc, System Disc, or Library Disc. In this circumstance, the Basic Disc is accessed for information. However, the program file label on the Basic Disc does not reveal it to be the same type disc unit as requested. For example,

the coding may have been ID=MD but the program file label on the Basic Disc identifies it as a System Disc.

*OS *PC033 * ID/OD = X = MD/SD/LD NOT ACCEPTED

The disc unit specified as an input disc or output disc and whose select number appears at X in the message has been identified in the order card as a Master Disc, System Disc, or Library Disc. However, such a type disc unit may not be used in this application.

*OS *PC034 * ID/OD = SD/MD/LD/BD/0 . . . F VN=XXXXXX WRONG

A volume number check of the disc unit specified as the input disc or output disc reveals that the volume number in the order card which is output in the message at XXX-XXX is not the same as that which appears on the volume itself.

OS PC035 * ID=OD NOT ACCEPTED

In the order card just read, the same disc unit has been specified for the input disc and the output disc. This is illegal in this application.

OS PC036 * ID/OD=WD UNDEFINED

The Work Disc has been specified as the input disc or output disc but no Work Disc has been assigned to the system.

*OS *PC037 * ID/OD=X=BD ILLEGAL

The Basic Disc, whose select number appears at X in the message, has been specified as the input disc or output disc. Use of the Basic Disc is illegal in this application.

The following two messages are informative and are not accompanied by a processing halt. However, a processing halt may follow output of either of the messages when they are part of error message information. That is, output with an error message which is accompanied by a processing halt.

* OS * PC900 * ID/OD=X : HDR1 . . .

The header label of the disc unit whose select number is output at X in the message and which has been specified as the input disc or output disc is listed at the printer.

* OS * PC901 * ID/OD=X : VOL 1 . . .

The volume label of the disc unit whose select number is output at X in the message and which has been specified as the input disc or output disc is listed at the printer.

d. * OSTP Operating System Tape Subroutine

This subroutine is part of the EDOS subroutine library and is called into store when required for processing. It is concerned with the functioning of tape units. If an error occurs, this subroutine outputs a message regarding the error and causes a processing halt. As to whether the error is considered recoverable or not, this determination is made by the order program which uses the subroutine. Any processing halt at address 02A6 will result in job abort when START is pressed at the console.

The messages output by this subroutine and the probable causes for each are described in the following list.

* OS * PC006 * TU=X : PERSISTENT ERROR

A persistent error occurs in attempting to read from the tape unit whose select number appears at X in the message. The message is output, the printer skips to the top of the next page, and the processing halt occurs. The determination of whether the error is recoverable or non-recoverable is made by the using order program.

*OS * PC007* TU=X : PERSISTENT ERROR

A persistent error occurs in attempting to write at the tape unit whose select number appears at X in the message. Other considerations are as for message PC006 output by this subroutine.

*OS * PC008* TU=X : OUT OF ORDER

An operation has been requested at the tape unit whose select number appears at X in the message but that tape unit is either out of order or not connected to the system. The message is output, the printer skips to the top of the next page, and processing halts at address 01DA. At this time the necessary adjustments may be made. When START is pressed processing resumes. If the adjustment was either not made or not made satisfactorily, the using order program determines if another attempt at recovery is to be made.

*OS * PC009* TU=X : POSITIONING ERROR

The tape reel mounted at the tape unit whose select number appears at X in the message cannot be positioned under the read/write head as required by the order program. The message is output, the printer skips to the top of a new page and processing halts. A determination of whether the error is recoverable of non-recoverable is made by the using order program.

OS PC010 * TU=X: END OF REEL

The end of the reel has been reached at the tape unit whose select number is output at X in the message. The meesage is output, the printer skips to the top of a new page and control is returned to the using order program for its determination as to whether this condition is an error in this application or not.

e. *IOTC Input/Output Tape Check

This subroutine is part of the EDOS subroutine library and is called into store when required for processing. Functions of this subroutine include: determination of the legality of using specific tape reels for specific purposes; checking the absence or presence of a tape reel on which an operation has been requested; checking for the absence or presence of standard files on a specific reel; checking volume numbers; and outputting header and volume labels.

If any error is detected while this subroutine is processing processing halts at address 02A6. When START is pressed the job is aborted, recovery not being considered possible under these circumstances.

The messages output by this subroutine and the probable causes of each are as in the following list.

OS PC050* IT/OT=X NOT ACCEPTED

An attempt has been made to use the tape unit whose select number is output at X in the message as an input tape or output tape. However, this tape unit may not be used in this manner in this application.

OS PC051* IT/OT=W1/W2/W3 UNDEFINED

An attempt has been made to use Work Tape 1, Work Tape 2, or Work Tape 3 as either the input tape or output tape but no such unit has been assigned to the system.

OS PC052 * IT/OT=X : VN=YYYYYY WRONG

A volume number check of the tape unit specified as an input tape or output tape and whose select number is output at X in the message reveals that the volume number in the order card which is output at YYYYYY in the message is not the same as that found on the volume.

*OS * PC053 * IT/OT = X NON STANDARD FILE

The tape unit whose select number is output at X in the message and which is to be used as the input tape or output tape does not contain a file defined as standard for EDOS operations. A standard file is required in this application.

* OS * PC054 * IT/OT=X : YYY . . .

The header label of the unit whose select number appears at X and which is to be used as the input tape or output tape is not formatted as required for such labels by EDOS. The information, as it appears on the tape reel, is output in the message at YYY . . .

The following message is informative and not accompanied by a processing halt. However, a processing halt may follow output of this message when it is a part of error message information. That is, output with an error message which is accompanied by a processing halt.

OS PC906* IT/OT=X : VOL 1 ...

The volume label of the tape unit whose select number appears at X and which is to be used as an input tape or output tape is listed in this message.

f. *SLSS Subroutine Label Search Subroutine

This subroutine is part of the EDOS subroutine library and is called into store when required for processing. This subroutine is concerned with the following functions: search for a specific subroutine in the subroutine library; ensurance that no two subroutines with the same name exist in the subroutine library at at the same time; and determination that the subroutine library is stored in the correct format.

When this subroutine discovers an error, the appropriate error message is output and processing halts at address 02A6. When START is pressed, the job in which the error was discovered will be aborted, no error recovery being possible in this case.

The messages output by this subroutine and the probable cause of each appear in the following list.

*OS * PC044 * SR=XXXXXX NOT FOUND

The subroutine on which an operation was requested and whose name appears at XXXXXX in the message cannot be located in the subroutine library. The message is output, the printer skips to the top of a new page, and processing halts at address 02A6.

*OS * PC045 * SR=XXXXXX MULTIPLE

More than one subroutine with the name which is output in the message at XXXXXX and which has been specified for processing exists in the subroutine library. The message is output, the printer skips to the top of a new page, and processing halts at address 02A6.

*OS * PC046* SUBROUTINE INDEX WRONG

The subroutine index has been found to be stored in an incorrect format. The message is output, the printer skips to the top of a new page, and processing halts at address 02A6.

g. *PLSS Program Label Search Subroutine

This subroutine is a part of the EDOS subroutine library and must be in store before any of the order programs using it may be executed. This subroutine is concerned with the search for specific programs in the program file. Its functions include: ensurance that more than one program in the program file does not have the same name; location of programs on which operations have been requested in the program file; determination that any program on which an operation has been requested is a type 1 program; and a check to determine that the program file has been stored in a proper format.

If an error is discovered while this subroutine is processing, the appropriate message is output; the printer skips to the top of the next page; and processing halts. The using order program determines if recovery is possible or not and the address where the processing halt occurs may vary from order program to order program.

The messages output by this subroutine and the probable causes of each are described in the following list.

OS PC040* PN/TP=XXXXXXXX NOT FOUND

The program or test program whose name is output at XXXXXXXX in the message and on which an operation has been requested cannot be located in the program file. The message is output, the printer skips to the top of a newpage, and processing halts. The using order program signifies if recovery is possible or not.

OS PC041* PN/TP=XXXXXXXX NOT AVAILABLE

The program or test program whose name is output at XXXXXXXX and on which an operation has been requested is of a secondary type and may not be processed in this application. The message is output, the printer skips to the top of the next page, and processing halts. The using order program signifies if recovery is possible or not.

*OS *PC042* PN/TP=XXXXXXXX MULTIPLE

An attempt has been made to process the program or test program whose name is output at XXXXXXXX in the message but more than one program by that name appears in the program file. The message is output, the printer skips to the top of the following page, and processing halts. The using order program signifies if recovery is possible or not.

*OS *PC043* PROGRAM INDEX WRONG

The program index has been stored in an incorrect format and no further processing is possible. The message is output, the printer skips to a new page, and processing halts at address 02A6. When START is pressed, the job is aborted.

h. *FDTUP File Definition Table Update

This subroutine resides in the EDOS subroutine library and must be in store before any of the order programs using it may be executed. This subroutine has the responsibility of processing the LBC detail card. As this card is used to update the file table, any field erroneously coded in the detail card will be ignored for updating purposes. That is, any error in the detail card will keep the respective field in the file table entry from being updated; the contents stored in this field before processing began will remain after processing is completed.

If any errors in the LBC card are discovered while this order is processing, the appropriate error message is output and processing continues. Control is returned to the using order program when all the fields in the LBC card have been processed. At that time, the decision regarding a processing halt, error recovery, etc. is made by the order program and varies from order program to order program.

The messages output by this subroutine result from fields in the LBC card being improperly coded. The messages and the probable cause of each are described in the following list.

```
* OS * PC140 * DT=XXXXX WRONG
```

This message is output when either the field in the detail card is coded improperly or the contents in the location accessed for the date are not in the proper format for a date.

```
* OS * PC181 * MU/AU=X WRONG
```

The select number of the unit specified as the main unit or alternate unit and which is output at X in the message has been assigned incorrectly.

*OS * PC182 * CO=XXXXXX WRONG

The YNƀ string portion of this field which is output at XXXXXX in the message has been coded incorrectly.

*OS * PC183 * PK INVALID

An attempt has been made to apply the tape recording density field to a disc file table entry.

*OS * PC188 * AU NOT ACCEPTED

An attempt has been made to assign an alternate unit to a non-sequential file.

*OS * PC199* FC=XXXXXX NOT FOUND

The file code, output at XXXXXX in the message is either coded improperly or entirely missing from the file table entry.

PART IV CONTROL CONSOLE AND PERIPHERAL DEVICE CONTROL PANELS AND FUNCTIONS

A. INTRODUCTION

The minimum configuration required for GE-120/GE-130 EDOS consists of the computer console, one disc unit, one card reader and one printer. The specific peripheral devices that may be used are as follows:

Disc unit:
- DSU160
- DSU110

Card reader:
- CRZ100

Card reader/punch:
- CRP100

Printer:
- PRT100
- PRT118
- PRT120

Card punch:
- CPZ101
- CPZ103

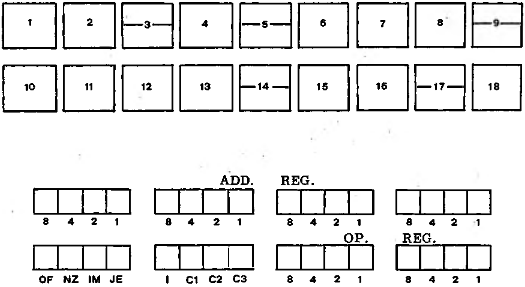
Magnetic tape unit:
- MTC101
- MTC160

These devices may be used in any number of combinations relative to both quantity and type. This part of the manual describes the operating controls of a typical minimum configuration system consisting of a DSU160 disc unit, a DSU110 disc unit (which, for programming purposes is considered to be two disc units since it contains two independent disc packs), a CRP100 card reader/punch, and a PRT100 printer. An illustration of each front control panel is included with the description of the function of each of the controls on that panel.

For any additional information regarding these or other devices that may be connected to the system, refer to the appropriate reference manual.

B. GE-120/GE-130 CONTROL CONSOLE

a. Control pushbuttons and indicators



BUTTON NO. AND CONTROL	FUNCTION
1. ON	Turns the system AC power on.
2. (blank)	This position is not used and is not marked.
3. DC ALERT/POWER OFF	When the red light in this control is on, it indicates overheating in the CPU and as a result,

BUTTON NO. AND CONTROL	FUNCTION
	DC power is turned off. DC power may also be turned off by the operator by pressing this button.
4. POWER ON	Turns the system DC power on.
5. MAINT ON/ LAMPS CHECK	When the red light in this control is on, it indicates that some switch in the console maintenance panel is not properly set for normal operation. This button is also used to check that all console lamps are properly functioning.
6. SWITCH 1	When the white light in this control is on, it indicates that the switch is set. The switch may be set and reset by pressing the button .
7. SWITCH 2	When the white light in this control is on, it indicates that the switch is set. The switch may be set and reset by pressing the button.
8. STEP BY STEP	When the white light in this control is on, it indicates that the switch is set. When set, one instruction is executed each time START is pressed. To return to automatic mode, reset STEP BY STEP and press START. This button is normally used to stop system processing.
9. LOAD 1/ LOAD 2	The white light on indicates which of the two input peripherals is being used for starting the system. The other peripheral may be selected by resetting the switch.

BUTTON NO. AND CONTROL	FUNCTION
10. red button (EMERGENCY OFF)	This is the emergency off button which, when pressed, turns system AC power off.
11. (blank)	This position is not used and is not marked.
12. STAND BY	The blue light on indicates that the switch is set. When set, the Elapsed Time Counter and START button are disabled. The switch may be set and reset by pressing the button.
13. (blank)	This position is not used and is not marked.
14. MEM. CHECK/ INV. ADDRESS	The red light on in the MEM. CHECK portion indicates an odd-parity error in reading from store. The red light on in the INV. ADDRESS portion indicates that an incorrect address has been used in an instruction. In either case, system processing stops.
15. CLEAR	When this button is depressed, the system stops processing and is cleared. This button is not normally used to halt system processing.
16. LOAD	Loads a bootstrap loader into store from the peripheral unit specified by the position of the LOAD 1/ LOAD 2 control.
17. HALT/START	This control is used for starting the system. When its white lamp is lit, it indicates that the HALT condition is set. It may be reset by pressing the button.

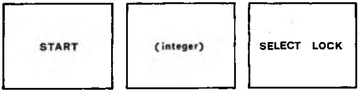
BUTTON NO. AND CONTROL	FUNCTION
18. OPERATOR CALL	When the blue indicator is lit, it indicates a condition that requires operator attention. The indicator is turned off by pressing CLEAR.

b. Program indicators

INDICATOR	FUNCTION
ADD. REG.	These 16 lamps indicate the hexadecimal address (in binary) of the next instruction to be executed. Each group of 4 indicators represents one hexadecimal digit.
OF	When lit, it indicates that the UF/OF status indicator is set to one.
NZ	When lit, it indicates that the ZE/NZ status indicator is set to one.
IM	When lit, it indicates that the Interrupt Mask in the PSR is set to one.
JE	When lit, it indicates that a program jump has occured.
I	When lit, indicates that a program interrupt is present.
C1, C2, C3	When any of these is lit, it indicates that the corresponding channel is busy.

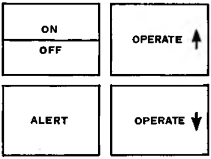
INDICATOR	FUNCTION
OP. REG.	These 8 lamps indicate the operation code of the next instruction to be executed. Each group of 4 indicators represents one of the characters in the op code.

C. DSU160 DISC UNIT



CONTROL	FUNCTION
START	Turns on power from the system's main power supply. When depressed, the unit starts and the control is lit in white. When reset, the indicator is turned off and the unit stops.
(integer)	Indicator number of the specific unit, this integer may have a value of 1 to 8. Approximately 20 seconds after the unit has been started, this indicator lights in green to indicate that the unit is ready for processing.
SELECT LOCK	This indicator lights in red when either certain error conditions exist or the unit receives operator call instructions. In this condition read or write instructions cannot be processed and the alert condition can be removed only by resetting the START control to turn the unit off.

D. DSU110 DISC UNIT



CONTROL	FUNCTION
ON/OFF	When set, turns off power from the system's main power supply and turns on the yellow OFF indicator. When reset, the unit receives power from the main power supply and the yellow ON indicator is lit.
OPERATE ↑	This button is depressed after the unit has been turned on to permit the upper disc pack to respond to program requests. When set, the green OPERATE ↑ indicator is lit.
ALERT	The red ALERT light indicates that a condition in the unit (such as excessive temperature) has caused an automatic turning off of power. This indicator is extinguished when the condition is corrected.

CONTROL	FUNCTION
OPERATE ↓	This button is depressed after the unit has been turned on to permit the lower disc pack to respond to program requests. When set, the green OPERATE ↓ indicator is lit.

E. CRP100 CARD READER/PUNCH

OFF	ON	PUNCH CHECK MAJOR FAULT	READ CHECK	PUNCH ONLY	END OF FILE	
STAND BY	OPERATE	MAIN TRACK EJECTION TRACK	SECOND.TRACK	MANUAL FEED MAIN	MANUAL FEED SECOND.	

CONTROL	FUNCTION
OFF	Turns off power to the unit and turns off all indicators except the red OFF indicator. To reset the switch and indicator, press ON.
ON	Turns on power to the unit lighting the white ON indicator and the white STAND BY indicator. To reset the switch and indicator, press OFF.
PUNCH CHECK/ MAJOR FAULT	The red PUNCH CHECK indicator lights when a punch error occurs. The erroneous card is in the second stacker, the unit goes into STAND BY, the white STAND BY indicator is lit and the OPERATE indicator is turned off. These indi-

CONTROL	FUNCTION
	cators are turned off when OPERATE is pressed. The red MAJOR FAULT indicator lights when the unit goes out of synchronization or a card jam occurs. In the latter case, MAIN TRACK, SECOND TRACK, or EJECTION TRACK indicators on indicate the location of the jam.
READ CHECK	When this red indicator is on, it indicates that a read error has occured. The erroneous card is in the second stacker, the unit goes into STAND BY, the white STAND BY indicator is lit, and the OPERATE indicator is turned off.
PUNCH ONLY	When this switch is set, the indicator lights and the unit operates as a punch only. Blank cards must be in the primary hopper. To resume read/punch operations, reset the switch.
END OF FILE	When the indicator is on, the primary hopper is empty. This control may be used only when the unit is in STAND BY. This switch may be reset by pressing the button.
STAND BY	This switch halts unit operation in STAND BY mode with the white indicator on and turns off the OPERATE indicator. The white STAND BY indicator may light for a variety of reasons explained in the appropriate reference manual, many requiring operator intervention. To resume operation, press OPERATE.

CONTROL	FUNCTION
OPERATE	Sets the unit under control of the CPU and turns on the white indicator. This switch may be reset by pressing STAND BY or OFF.
MAIN TRACK/ EJECTION TRACK	The red MAIN TRACK indicator lights when a condition in the primary hopper or primary track requires operator intervention. This indicator is turned off by pressing OPERATE, MANUAL FEED MAIN, or MANUAL FEED SECOND. The red EJECTION TRACK indicator light lights when one of the stackers is full, a card jam occurs in the ejection track, or the chad box is full. This indicator is turned off by pressing OPERATE, MANUAL FEED MAIN, or MANUAL FEED SECOND.
SECOND TRACK	This red indicator lights when a condition in the secondary hopper or secondary track requires operator intervention. It may be turned off by pressing OPERATE, MANUAL FEED MAIN, or MANUAL FEED SECOND.
MANUAL FEED MAIN	Feeds cards from the primary hopper to Stacker 2 for as long as the button is depressed. This control is operative only in STAND BY mode.
MANUAL FEED SECOND	Feeds cards from the secondary hopper to Stacker 2 for as long as the button is depressed. This control is operative only in the STAND BY mode.

F. PRT100 PRINTER

~OFF	=OFF	=ON	PRINT CHECK PAPER	TOP PAGE	SINGLE LINE	NO SKIP
~ON	STAND BY	OPERATE	FUSE LAMP	RIBBON FORWARD	RIBBON BACK	

CONTROL	FUNCTION
~OFF	Turns off a.c. power to the printer and all lights except the ~ OFF indicator. This yellow light is turned off by pressing the ~ ON switch.
=OFF	Turns off d.c. power to the printer and all lights except the =OFF indicator. The yellow light is turned off by pressing the =ON switch.
=ON	Supplies d.c. power to the printer and turns on the =ON indicator. If ~ ON had been pressed previously, the unit goes into STAND BY. This switch also turns off the FUSE/LAMP indicator if the condition has been corrected. The yellow light indicates d.c. power is on.

CONTROL	FUNCTION
PRINT CHECK/ PAPER	The PRINT CHECK red light indicates that a print error has occurred. The unit is in STAND BY. To resume operation, press OPERATE and START (at the GE-120/GE-130 console). The PAPER red light indicates a paper problem has occurred. The unit is in STAND BY. The indicator is turned off automatically when the condition is corrected. To resume operation, press OPERATE.
TOP PAGE	Causes the paper to skip to the top of the next page when depressed. This control functions only in STAND BY.
SINGLE LINE	Causes the paper to advance to the next line when depressed. This control functions only in STAND BY.
NO SKIP	When this white indicator is lit, all TOP PAGE commands are supressed. To turn off the indicator and permit TOP PAGE commands, reset the switch by pressing the button.
∿ON	Supplies a.c. power and turns off d.c. power to the printer and turns on the yellow ∿ON and =OFF indicators. This switch should be pressed before the =ON switch.
STAND BY	Sets the printer into STAND BY mode, turning on the blue STAND BY indicator and turning off the OPERATE indicator when the button is pressed. A variety of conditions requiring

CONTROL	FUNCTION
OPERATE	When depressed, puts the printer under control of the central processor, turning on the green OPERATE indicator and turning off the STAND BY indicator.
FUSE/LAMP	The FUSE red light indicates that the fuse has blown. The LAMP red light indicates that the VFU or photoelectric lamp is not operating. After repairs have been made, press =ON and OPERATE to resume processing.
RIBBON FORWARD	When depressed, it lights the white RIBBON FORWARD indicator and causes ribbon to be wound onto the upper spool. To stop winding, reset the switch. This control functions only in STAND BY.
RIBBON BACK	When depressed, it lights the white RIBBON BACK indicator and causes ribbon to be wound onto the lower spool. To stop winding, reset the switch. This control functions only in STAND BY.

PART V - APPENDICES

A. GLOSSARY

TERM	DEFINITION
Absolute Address	See Address, Absolute.
Access, Random	Pertaining to the obtaining or placing of information into store where no undesired items or locations need be processed before the access operation can be completed.
Access, Sequential	Pertaining to the obtaining or placing of information into store where the number of undesired items of information or locations that must be processed before the desired location or item can be reached determines the time required for such access.
Address	A name, label, or number for a specific store location.
Address, Absolute	A location in store which is identified by a specific machine code address numbering system.
Address, Relative	An identification of a specific store location which must be modified or translated by any of several means or formulas to arrive at the absolute address.
Address, Symbolic	A label used to specify a specific location in store in the context of a specific program.

TERM	DEFINITION
Allocation, Store	The process of reserving specific areas of store for specific information items.
Alphanumeric	The set of symbols which includes letters of the alphabet, numbers and special symbols.
Application	A system or problem deemed suitable for processing or solution by a computer.
Area, Input	A section of store allocated to receive information in some manner sent to the computer for processing.
Area, Output	A section of store allocated for information that is in some sense to be transmitted to a device other than the internal store.
Array	A collection or set of items specifically organized in some manner.
Assembler	A program which has as input symbolic data and as output instructions in a form useful to a machine for carrying out a variety of functions. This translation is generally conducted on an item-by-item basis: one item of machine-usable data output for each item of symbolic data input.
Assembly List	See List, Assembly.
Auxiliary Equipment	See Equipment, Off-Line.
Batch Processing	See Processing, Batch.

TERM	DEFINITION
Binary Coded Character	See Character, Binary Coded.
Bit, Parity	A bit used to check the correct maintenance of data during manipulations. If a 1 parity bit indicates that a specific character or word has an odd number of 1 bits, then a 0 parity bit indicates it has an even number of 1 bits. When words or characters have an odd number of 1 bits, reference is made to odd parity; if they have an even number of 1 bits, reference is made to even parity.
Blank	A character used to indicate a space on output (character position in a printer, card column in a punched card, etc.) in which nothing is to be located. This is sometimes written ƀ.
Block	A group or number of consecutive positions which are treated as a unit in processing.
Bootstrap	A technique or program used for reading initial information into store.
Branch	A selection of one of two or more possible processing paths as the result of the occurrence.
Call In	A transfer of control from the main routine in execution to a subsidiary routine which has been inserted in the regular sequence of operations to fill a subsidiary function.
Calling Sequence	See Sequence, Calling.

TERM	DEFINITION
Capacity, Store	The number of elementary data items that can be retained at one time in the storage device. For core store, this figure is defined in octets.
Card, Control	See Card, Order.
Card Field	See Field, Card.
Card Order	The primary card which contains input data for the specific application of a general routine or which calls a specific routine into execution.
Character	One symbol of a set of elementary symbols such as the letters of the alphabet.
Character, Binary Coded	One symbol of a set of elementary symbols in which each symbol is represented by a defined set of consecutive binary digits.
Character Density	See Density, Character.
Character, Illegal	A character or combination of bits which is not accepted by the machine or a specific routine as appropriate to its requirements.
Character Set	See Set, Character.
Check, Parity	A summation check in which the 1 bits in a given size element are summed and the odd or even disposition of the total is compared to the parity bit.

TERM	DEFINITION
Checkpoint	A specific instant at which processing is halted to permit the gathering of sufficient information for the purpose of later evaluation of progress to that instant.
Clear	To erase the contents of a store device by replacing them with blanks or some other predetermined single character.
Control Card	See Card, Order.
Code, Symbolic	A code which identifies addresses and machine operations by means of various labels which are independent of machine design.
Comment	A step which identifies or explains a particular condition but other than being relayed by the machine has no effect on machine operation.
Compiler	A program which is capable of translating from source to object languages and replacing certain single items of input with multiple machine instructions on output.
Configuration	Generally, the group of machines or devices connected and arranged to operate as a system.
Copy, Hard	Machine output in printed form consisting of reports, listings, etc.
Data	Refers to basic elements of information manipulated by the computer. Synonymous with information.

TERM	DEFINITION
Data Element	See Element, Data.
Deck	A complete set of cards punched and arranged to serve some single purpose.
Density, Character	The number of characters that can be stored in a unit of length to which length is applicable. For example, the number of bits that can be stored on an inch of tape.
Dump, Store	A listing of the entire or partial contents of a store device.
Element, Data	A specific item of information which appears in a set of data.
End-Of-File	Termination point of a set of data. End-of-file indicators are normally used to identify this point.
Equipment, Auxiliary	See Equipment, Off-Line.
Equipment, Off-Line	Peripheral equipment or devices operating under the direct control of the central processing unit.
Equipment, Peripheral	Auxiliary machines which may be placed under the direct control of the central processing unit.
Erase	To replace the contents of a store device, or a selected part of those contents, by binary zeros.

TERM	DEFINITION
Execute	To perform the requested machine operation or data manipulation.
Field, Card	A set of columns in a card, either fixed by column number or position relative to other fields and generally designed to contain a specific type of information.
File	An organized collection of information gathered for some specific purpose and arranged according to some plan.
Format	A predetermined and defined arrangement of specific items input to or output by a routine or computer such as information on a card, that output by a printer, etc.
Hardware	The physical equipment that constitutes a computer system.
Hard Copy	See Copy, Hard.
Illegal Character	See Character, Illegal.
Initialize	To prepare the system or some part of the system for a specific processing function. This may involve setting switches, filling counters, accessing information, etc.
Input Area	See Area, Input.

TERM	DEFINITION
Label	A set of symbols used to identify a specific item (such as an address or instruction) or collection of items.
Language, Machine	The use of symbols to represent data and instructions appropriate to a specific machine and which may be used by that machine without translation.
Language, Object	The language which is used to output data by a translating routine such as a compiler or assembler.
Language, Source	The original form in which a program is prepared for processing by a translating routine such as a compiler or assembler.
List, Assembly	A list, output at the printer during an assembly or compilation of the source program, which generally identifies the source language statement and the resulting object coding.
Load	To store date in a specific location or generally, somewhere in core store.
Load-And-Go	A type process which not only translates a source program but automatically initiates execution of the resulting object program.
Machine Language	See Language, Machine.
Machine Run	See Run, Machine.

TERM	DEFINITION
Message	A group of words processed as a unit and intended to provide information regarding a specific condition.
Object Language	See Language, Object.
Object Program	See Program, Object.
Off-Line Equipment	See Equipment, Off-Line.
On-Line Equipment	See Equipment, On-Line.
Operation	The activity specified by a single computer instruction.
Order Card	See Card, Order.
Output Area	See Area, Output.
Overflow	A condition which arises when data to be stored exceeds the amount of store reserved to contain it.
Overlay	A set of instructions or routines required in store only periodically and which may be called in on an as-required basis, temporarily replacing another such set of instructions.
Parity Bit	See Bit, Parity.
Parity Check	See Check, Parity.

TERM	DEFINITION
Peripheral Equipment	See Equipment, Peripheral.
Processing, Batch	A technique where items to be processed sequentially are collected and organized to facilitate machine operation and manipulation of data.
Program, Object	The program which is output by a translating routine working on a source program.
Program, Source	A program which is to be processed by a translating routine.
Random Access	See Access, Random.
Relative Address	See Address, Relative.
Relocate	To move information in store from one location to another.
Run, Machine	The execution of one or more routines linked in such a way as to facilitate continuous machine operation.
Sequence, Calling	The set of instructions and data used for linking a closed subroutine with the main or calling routine.
Sequential Access	See Access, Sequential.
Set, Character	A rigidly defined collection of representations or symbols where each symbol is different from every other symbol and no two symbols are assigned the same relative value.

TERM	DEFINITION
Software	The collection of programs and routines used to manipulate the physical machinery of the computer in a prescribed manner.
Source Language	See Language, Source.
Source Program	See Program, Source.
Store Allocation	See Allocation, Store.
Store Capacity	See Capacity, Store.
Store Dump	See Dump, Store.
Symbolic Address	See Address, Symbolic.
Symbolic Code	See Code, Symbolic.
Unpack	To separate sections of an existing record, word, octet, etc. and store the parts in separate, remote locations.

B. PREREQUISITE AND RELATED READING

For information regarding subsystems and peripheral devices which may be connected to a specific system, refer to the appropriate manual.

Codes	Title	Catalog Number
PT;PS; RA;RO;RN	GE-120/GE-130 EDOS Programmer's Manual, Volume 1	To be assigned
PT;PS; RA;RO;RN	GE-120/GE-130 EDOS Programmer's Manual, Volume 2	To be assigned
PT;PA; PS;PO;RN	GE-130 APS Programmer's And Operator's Manual	1079
RT;RA; RS;RO;RN	GE-100 Line COBOL Manual	1224
RT;RA; RS;RO;RN	GE-100 Line FORTRAN Manual	To be assigned
RT;RA; RS;RO;RN	GE-120/GE-130 RPG Manual	1257
RT;RA; RS;RO;RN	GE-130 SPG Manual	To be assigned
PA;PS; PO;RT;RN	GE-100 Line DSS 161 Disc Storage Subsystem	1098

Codes	Title	Catalog Number
PA;PS; RT;RO;RN	GE-130 Subroutines, Volume 1	1225
PA;PS; RT;RO;RN	GE-130 Subroutines, Volume 2	1246

Codes: P = Prerequisite Reading
R = Related Reading
T = Technical Programming Mgr.
A = Applications Programmer
S = Systems Programmer
O = Computer Operator
N = Non-Technical Mgr.

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